The RUBBER AGE

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Late News of the Rubber Industry

U. S. Crude Rubber Consumption Was 41,526 Long Tons in July

CONSUMPTION of crude rubber of all classes by manufacturers in the United States in the month of July is estimated at 41,526 long tons, according to statistics compiled by the Rubber Manufacturers Association. This compares with an estimated consumption of 43,228 long tons for the month of June.

Total consumption of crude rubber by American manufacturers for the first seven months of this year is estimated at 310,834 long tons. Consumption during the first seven months of 1928 was 248,972 long tons.

These estimates are based on reports received by the association from manufacturers who are estimated to represent 90 per cent of the total consumption in the United States.

The association estimates total domestic stocks of crude rubber on hand and in transit overland on July 31 at 95,536 long tons, compared with 92,062 long tons as of June 30. Crude rubber afloat for United States ports on July 31 is estimated at 38,859 long tons as against 46,036 long tons on June 30. These estimates are based on reports to the association which are believed to represent 95 per cent of the total for the United States.

144,974 Tons of Reclaimed Rubber Used in First 7 Months of 1929

NEW high records for the use of reclaimed rubber have been set by American manufacturers this year. According to figures compiled by the Rubber Manufacturers Association, raised to a 100 per cent basis, total consumption of reclaimed rubber for the first seven months of this year is estimated at 144,974 long tons. This compares with an absorption of 124,945 long tons during the first seven months of 1928.

July consumption of reclaimed rubber was higher than had been expected at 19,450 long tons, equal to 46.9 per cent of the amount of crude rubber consumed. This compares with a consumption of 18,141 long tons in June, equal to 42 per cent of the amount of crude absorbed, and with a consumption of 19,070 long tons in July, 1928, equal to 51 per cent of the crude rubber used in that month.

Production of reclaimed rubber in the United States during July is estimated at 18,387 long tons, lower than for any month since February of this year. The total production of reclaimed in the first seven months of 1929 has been 133,850 long tons, as compared with 117,619 long tons for the same period in 1928. Stocks of reclaimed rubber on hand in this country as of July 31 were 19,679 long tons, as against 17,980 long tons on June 30 and 17,305 long tons on July 31, 1928.

Exports of reclaimed and scrap rubber from the United States have been heavier this year than during 1928, according to official reports of the Rubber Division of the Bureau of Foreign and Domestic Commerce. In the first half of 1929, 7,072 long tons of reclaimed rubber were shipped out of this country, valued at $1,110,424, as compared with exports in the first six months of 1928 of 5,075 long tons, valued at $841,250. The stability of the price of reclaimed rubber is shown by the fact that the unit value of these first half exports was 7.01 cents a pound in 1929 as against 7.40 cents a pound last year.

Scrap and old rubber exported from the United States in the first half of 1929 totaled 11,717 long tons, valued at $1,255,699, as compared with shipments in the same period of last year of 10,067 long tons, valued at $1,249,286. There was a greater variance in the unit values of scrap exports, the average price in 1929 being 4.78 cents a pound as against 5.54 cents a pound in 1928.

Hood Rubber Company To Be Merged With B. F. Goodrich

STOCKHOLDERS of the Hood Rubber Company, Watertown, Mass., will vote on August 30 on a plan to merge their company with the B. F. Goodrich Company through an exchange of common shares. Directors of both companies have already approved the project, which will result in a consolidated organization with annual sales of over $180,000,000, making it probably the second largest rubber manufacturing unit in the world.

The plan of consolidation provides that Goodrich shall acquire the assets and business of the Hood company through a subsidiary company which will assume the Hood company debts and that all preferred and special stocks of the Hood Rubber Company and the Hood Rubber Products Company shall be paid off in cash at the earliest call date. The 200,000 shares of Hood Rubber Company no par common stock will be exchanged for 100,000 shares of Goodrich common. Hood common shares have advanced in price on the Boston Stock Exchange and the New York Curb Exchange from their 1929 low of 18 to a new high of 37½ by August 20, on which date Goodrich common was selling at about 75.

A statement by the directors of the B. F. Goodrich Company after their meeting on August 19 said in part,

"Goodrich is one of the largest manufacturers of tires, including the famous Silvertown cords, and mechanical and other rubber goods, and Hood company products include the nationally known Hood line of rubber and canvas footwear. Thus the two businesses are largely complementary and their consolidation should result in substantial economies."

The Hood Rubber Company was incorporated in 1896 and has a plant at Watertown, Mass., with 96 acres of land and buildings with 2,048,510 square feet of floor space. While rubber footwear constitutes over 60 per cent of its output, its products also include automobile tires and inner tubes, rubber flooring and rubber molded goods.

The Hood Rubber Company owns all the common stock of the Hood Rubber Products Company, which distributes the Hood products. This company was incorporated in 1919 as a consolidation of the following subsidiaries of the Hood Rubber Company: Hood Tire Company, Inc., Watertown; Pilgrim Rubber Footwear Company, Boston; Pioneer Rubber Shoe Company, Minneapolis; Dearborn Rubber Company, Chicago; Iowa Rubber Shoe Company, Davenport, Ia.; Southwest Rubber Footwear Company, Kansas City, Mo.; Capital City Rubber Company, Columbus, O.; and Grand Rapids Shoe & Rubber Company, Grand Rapids, Mich. It maintains branches and warehouses in 40 cities of the United States. It has outstanding $500,000 of common stock, all of which is held by the Hood Rubber Company, and $1,000,000 of 7 per cent cumulative preferred stock.

The Hood Rubber Company had outstanding as of December 31, 1928, $5,627,400 7½ per cent preference stock, $492,600 7 per cent preferred stock, $190,870 8 per cent employes' special stock, and 200,000 shares of no par common stock. Dividends on the preferred and employes' special shares have been paid regularly. The common shares received quarterly dividends of $1 from December 31, 1920, to March 31, 1927, and on December 31, 1927, and March 31, 1928. No dividends have been paid on the common stock since. The funded debt consists of an issue of $5,400,000 of 15-year 7 per cent sinking fund gold notes, dated December 1, 1921, of which $600,000 has been retired, and $5,000,000 of 10-year 5½ per cent convertible gold notes, dated October 15, 1926.

Hood reported a net loss of $1,478,104 in 1928, due to the break in the rubber market. Net sales were $29,977,550, while those of Goodrich were $148,805,178, making a total of $178,782,728. Goodrich sales thus far in 1929, however, have shown substantial increases, and Hood sales are also believed to be considerably higher.

United States Rubber Company Merging Tire Plants at Detroit

CONCENTRATION at Detroit of the tire activities of the United States Rubber Company will be effected in the next few weeks, according to an announcement authorized August 19 by F. B. Davis, Jr., chairman and president.

This will involve the removal of all the executives, sales and office staffs of the tire department of the company to that city from the present general offices at 1790 Broadway, New York. There will also be a greater centralization of the tire manufacturing in Detroit, including the transfer to this city of the manufacturing operations now being carried on at Hartford, Conn. The factory there will soon be closed until further notice.

While no official estimate has been given as to the increased employment in Detroit due to these changes, it is expected that ultimately several thousand employees will be added to the payroll in that city.

At the present time only a part of the tire producing activities are located in Detroit, in the former Morgan & Wright factories on East Jefferson Avenue. The factories there are strategically located on the Detroit River with adjoining railroad facilities—in the center of the motor car industry. The plant is being greatly improved in machinery and methods to make it one of the most efficient units in the tire manufacturing industry.

Two floors of one of the largest buildings in the group are being fitted up as offices for the manufacturing, engineering and sales personnel. It is expected that the change in headquarters will take place about October 1.

This move is seen as a further step on the part of the United States Rubber Company in the plan to simplify the huge operations of the company which was announced shortly after the recent changes in management and executive personnel.

L. D. Tompkins, vice-president and general manager of the tire department, said that the advantages that were expected to accrue from this greater centralization of the company's tire activities were economies in production, overhead cost and management; closer proximity for deliveries to the motor car and truck industry; more central location for general retail tire distribution and closer supervision and coordination of all tire building activities.

When the changes have been completed, Detroit will become literally the home of United States tires and regain the position of prominence in the tire world which belonged to it thirty years ago when Morgan & Wright was the leading tire manufacturer of the world in the days of the bicycle. When the present plant moved to Detroit from Chicago in 1906 the automobile was in its infancy and Detroit was a city of only 200,000 population. Detroit was selected as the location for the factory because it was believed that Detroit was destined to become the automobile center of the country.

Among the important functions which will be carried on at the factory here are the large experimental or development department, machine shop activities, field engineering work, and technical service department.

Tire Manufacturers' Division Elects Officers for New Year

A MEETING of the Tire Manufacturers Division of the Rubber Manufacturers Association was held on July 11 at the Portage Country Club, Akron, O. The meeting was well attended, thirteen companies being represented.

L. A. McQueen of the B. F. Goodrich Company, was elected chairman of the division and H. L. McClaren of the Ajax Rubber Co., Inc., was elected vice-chairman, both to serve for one year.

The member companies elected to be represented on the executive committee of the Tire Division for the ensuing year are: Dayton Rubber Mfg. Co., Dunlop Tire & Rubber Corp., Fisk Rubber Company, General Tire & Rubber Co., Goodyear Tire & Rubber Co., Hood Rubber Company, Kelly-Springfield Tire Company, Mansfield Tire & Rubber Co., Michelin Tire Company, Miller Rubber Company, Mohawk Rubber Company, Norwalk Tire & Rubber Co., Pennsylvania Rubber Company, Seiberling Rubber Company and the United States Rubber Company.

Among the subjects discussed by the division were a proposal for standardizing maximum cross section dimensions of passenger car super balloon tires; a proposed interchangeable or combination tube program; the possibility

of adopting a standard form of warehouse contract; and recent legislation affecting the tire industry.

The association office was also instructed to compile and report statistics covering the inventory, production and shipments of industrial truck tires, as a regular separate report in future; such reports to be distributed to those companies which participate in the compilation of monthly figures.

Bankruptcy Petition is Filed Against Swinehart Tire & Rubber

AN INVOLUNTARY petition in bankruptcy for the Swinehart Tire & Rubber Company, Akron, O., charging that the company is insolvent and asking that the factory be sold to pay the claims of creditors was filed July 25 in federal court in Cleveland. The application was transferred to the court of Harry L. Snyder, Akron referee in bankruptcy, but was returned to the Cleveland court when Judge John Paul Jones came back from his vacation and was scheduled for an early hearing.

The petition was filed by the English Mica Company, New York City, the Poncet Davis Company, and the C. P. Hall Company, both of Akron. Liabilities of the Swinehart company are set at $450,000 in the petition, the largest item being $310,000, owed to two Akron banks, the First Trust & Savings Bank and the Central Savings & Trust Company. The other creditors are dealers in rubber, fabric, chemicals and other materials used in tire manufacturing.

The bankruptcy action was started, the petition says, because of preferential payments made to the two banks on paper which they hold, indorsed by Thomas Walsh, president of the Swinehart Company. The other creditors claim payments should have been made to the banks on the same basis as payments to the smaller claimholders. In other petitions the creditors asked that a receiver for the Swinehart company be named at once. This is asked for on the grounds that the company has a lack of working capital and, the creditors claim, it will be necessary to liquidate the assets to pay the outstanding indebtedness.

The assets of the Swinehart Tire & Rubber Company consist of the plant at North Howard and North Streets, Akron, the equipment, land and stock on hand. The value of the property was not fixed in the petition.

The Swinehart company was organized at Akron in 1904 and started in the rubber business manufacturing solid tires. Later it turned to the manufacture of pneumatic tires, but the bulk of its business has been in the solid tire line. Mr. Walsh has been president of the company since 1921, when a line of cushion tires was added. The company purchased the Erie Rubber Company early this year, buying out the business, patents and plans of the firm, without taking over its former factory at Sandusky.

The balance sheet of the company as of December 31, 1928, showed total current assets of $868,790, as compared with total current liabilities of $628,859, leaving an indicated net working capital at that time of $240,201. Cash on hand amounted to $21,829, accounts receivable, $300,757, and inventories, $486,509. Notes and acceptances receivable were held at $19,586, and the cash surrender value of life insurance held was $40,109. Land, buildings, equipment, etc., were valued at $1,055,457, patents at $44,000, and prepayments at $4,859. There was a profit and loss surplus of $92,168, a reserve for depreciation of $59,372, a miscellaneous reserve of $84,000, and a reserve for doubtful accounts of $10,000.

Capitalization of the company consists of $500,000 in 7 per cent cumulative preferred $100 par stock, of which $293,777 is outstanding, and $1,000,000 in $100 par value common stock, of which $815,200 is outstanding. There is no funded debt, and no dividends are being paid on the common and payments are in arrears on the preferred, amounting to 57¼ per cent up to June 1, 1929. The common stock is listed on the Cleveland Stock Exchange, but is very inactive.

W. McE. Weldon is vice-president of the company and C. O. Baughman, secretary. Directors are T. F. Walsh, Mr. Weldon, J. E. Foster, W. A. Walsh, Charles McCaskey, W. H. Marlatt, A. G. Ryley and Andrew Dies.

Program Planned for Meeting Of Rubber Division Chemists

PLANS are now practically complete for the Atlantic City meeting of the Rubber Division of the American Chemical Society from September 26 to 28. It should be noted that the Rubber Division will not meet at Minneapolis with the other sections of the American Chemical Society, but will hold its own sessions at the Chalfonte Haddon Hall hotel, Atlantic City, N. J., with the New York Rubber Group as hosts.

C. R. Johnson is going to tell about "The Role of Oxygen in Carbon Black." A. A. Somerville will present a paper on "Aging of Rubber Under Tension." W. A. Gibbons will talk on "A Laboratory Flexing Test for Tire Carcass and Belts." R. H. Gerke has a paper on "The Thermodynamics of Rubber."

Sidney M. Caldwell, chairman of the program committee of the New York Rubber Group, advises that reservations should be made now direct to the Chalfonte Haddon Hall hotel for September 26, 27 and 28.

United States Rubber Company Earns $596,926 in Six Months

FOR the six months ended June 30, 1929, the United States Rubber Company reports an operating profit of $596,926, estimates a net income of approximately $350,000 for its plantation subsidiary, and states that it has reduced its property adjustment reserve by $1,386,413 through charges covering disposition of obsolete tire molds and other machinery and equipment. This is an improvement of $2,686,923 over the first six months of 1928 when expressed comparably, in addition to the loss of $14,147,659 incurred last year due to the adjustment of the value of rubber in all inventories as of June 30, 1928, according to F. B. Davis, Jr., president and chairman of the board.

"Net sales after all discounts and allowances amounted to $86,073,346 for the six months," Mr. Davis says in his report to stockholders, "an increase of $1,892,240 or 2.25 per cent over the corresponding period of 1928 on a comparable basis. The sales and earnings for the first six months of 1928, as reported at that time, included an estimate for one of the subsidiary companies which proved to be too high. Actual figures for all activities have been obtained for the current period and comparisons are made with the corresponding amounts for the first six months of last year, including three additional subsidiary companies now consolidated, which were carried as investments prior to December 31, 1928.

"Selling prices of all commodities averaged substantially lower this year than last year. Unit sales of tires increased, but there was a slight decrease in dollar value because of continuing lower selling prices. Decreases in sales occurred in miscellaneous commodities such as soles and heels, flooring, rubber clothing and reclaimed rubber. Sales of waterproof, Keds, and mechanical goods such as packing, hose, molded specialties, wire, etc., increased over the corresponding period of last year both in value and in units. Golf ball business increased materially, both as to sales and profits. The operations of the chemical subsidiary, which

supplies the company as well as outside customers, were gratifying.

"No adjustment in value of inventories was necessary as of June 30, 1929. No dividends were taken from the plantations company during the first six months of this year, whereas $1,000,000 was received during the first six months of 1928.

"Production of rubber on the plantations owned by your company continues to show substantial increases and the earnings, in view of the lower market price of crude rubber, have been satisfactory. Net income, after liberal reserves for amortization, depreciation and foreign income taxes, amounted to approximately $350,000, none of which has been included in the consolidated earnings of the United States Rubber Company.

"Bank loans have been reduced $23,250,000 since the first of the year by means of the funds secured through the sale of common stock in January, 1929. The remaining bank loan of $2,500,000 is that of a subsidiary company which it was deemed advisable to continue. Funded indebtedness amounting to $2,903,000 was retired during the six months.

"The provision for property and equipment adjustments and other contingencies amounting to $10,000,000, which was created at December 31, 1928, was reduced by $1,386,413 through charges covering the disposition of obsolete machinery and equipment including obsolete tire molds. Consolidation of activities has permitted the closing of two additional plants since the first of the year and consideration is being given to further consolidations."

Statement of current assets and current liabilities as of June 30, 1929, compares as follows with the three previous years:

CURRENT ASSETS

	1929	1928	1927	1926
Cash	$ 7,822,167	$ 8,378,521	$ 8,146,433	$ 10,289,782
Accts. & nts. rec. less res.	40,481,782	44,964,073	46,007,454	50,129,441
Inventories	74,786,891	65,810,237	95,715,951	109,545,666
Total cur. as'ts	$123,090,840	$119,152,831	$149,869,838	$169,964,889

CURRENT LIABILITIES

Bank loans	$ 2,500,000	$ 17,750,000	$ 17,550,000	$ 10,200,000
Accts., drafts & accept.	16,025,090	*20,958,436	20,626,450	33,650,778
Total cur. lia.	$ 18,525,090	$ 38,708,436	$ 38,176,450	$ 43,850,778

*Includes balance payable to Crude Rubber Agency for company's proportion of difference between cost and market.

Goodrich Earnings Increase As Sales Reach New Record

EARNINGS of the B. F. Goodrich Company for the first six months of 1929 totaled $5,070,518 after provision for depreciation, interest and federal income tax, equivalent after preferred dividends to $4.09 a share on the common stock outstanding June 30. This was announced by the board of directors of the company after the regular quarterly meeting held on August 7.

This figure shows a substantial improvement over the first half of last year, which resulted in a loss of $1,574,889, and with the entire year of 1928, which showed a profit of $3,513,023, leaving a deficit after common and preferred dividends. The net profit for the current year compares with the first half earnings of $5,813,501 in 1927, $1,358,616 in 1926, and $7,106,616 in 1925.

Consolidated net sales for the first six months of the year amounted to $75,375,871 indicating a steady growth over the past five years. Sales in the same period of previous years were $70,624,878 for 1928, $69,274,347 for 1927, $67,690,286 for 1926, and $60,434,755 for 1925.

The regular dividend of $1.75 per share was declared on the preferred stock, payable October 1 to stockholders of record September 10. A dividend of $1 per share was declared on the common stock, payable September 2 to holders of record August 17.

The board issued a statement to the effect that all raw materials on hand and on commitment as well as in finished goods inventories are at values not to exceed market prices as of June 30.

Total assets of the company as of June 30 were $138,040,259, comparing with $120,179,599 on June 30, 1928, and surplus was $26,735,216 as against $23,251,827 last year. Current assets were $83,520,888 and current liabilities $18,953,377, compared with $73,593,741 and $17,966,121, respectively, on June 30, 1928.

The consolidated income account for six months ended June 30, 1929, compares as follows with the first half periods of preceding years:

	1929	1928	1927	1926
Net sales	$75,375,871	$70,624,878	$69,274,347	$67,690,286
Expenses, etc.	67,742,297	69,741,298	60,071,754	63,655,741
Balance	$7,633,574	$883,580	$9,202,593	$4,034,545
Other income	1,241,011	405,406	481,778	323,573
Total income	$8,874,585	$1,288,986	$9,684,371	$4,358,118
Depreciation	1,803,742	1,558,341	1,436,276	1,224,432
Interest	1,328,704	1,305,534	1,484,594	1,491,563
Estimated federal tax..	633,000	.....	950,000	283,507
Min. interest	38,621	.....	.....	.....
Net profit	$5,070,518	*$1,574,889	$5,813,501	$1,358,616
Preferred dividends	1,165,990	1,207,570	1,249,150	1,290,730
Common dividends	1,699,548	1,458,264	1,203,420	1,203,120
General contingent res...	.....	.....	750,000	.....
Surplus	$2,204,980	†$4,240,723	$2,610,931	†$1,135,234

*Loss. †Deficit.

Parts and Accessories Industry Expects Favorable Third Quarter

MANUFACTURERS of automotive parts and accessories have ended the first half with business substantially ahead of any previous six months' period in the history of the industry, and as the third quarter gets under way operations continue well ahead of the same period in previous years. Production in June showed a moderate seasonal decline from May, as was expected, according to the Motor and Equipment Association, of which many rubber and tire manufacturers and distributors are members.

Favorable business, probably ahead of last year, is expected for the third quarter. Manufacturers of parts and accessories for original equipment of cars and trucks, and service parts and service equipment for the wholesale trade shared this large gain in business. The large increase in the number of automobiles in use in this country and abroad has caused suppliers of units and parts to maintain unusually heavy schedules.

Aggregate shipments in June of several hundred manufacturers supplying parts and accessories to the car and truck manufacturers, and parts, accessories and garage repair equipment to the wholesale trade were 208% of the January, 1925, base index of 100, as compared with 245 in May and 190 in June, last year.

Parts and accessory manufacturers selling their products to the car and truck manufacturers for original equipment made shipments aggregating 231% of the January, 1925, figure, as compared with 278 in May, the record month for all time, and 200 in June, last year. Accessory shipments to the wholesale trade in June were 90%, as compared with 91 in May and 110 in June, last year. Although accessory business has been adversely affected for several years by additional standard equipment at the car plants and accessory distribution by some car manufacturers, the business showed an improvement during the first half.

Service equipment shipments, that is, repair shop equipment and tools, of member companies in June were 186% of January, 1925, as compared with 200 in May and 140 in June, last year.

An Official Tribute to Reclaimed Rubber

By P. W. BARKER

Assistant Chief, Rubber Division, Bureau of Foreign and Domestic Commerce

ONE of the most outstanding and beneficial results of the world experiment in the monopolistic control of rubber known as the Stevenson Restriction Scheme, is the modern conception of reclaimed rubber and its use in rubber manufacturing. It is entirely possible that without the stimulus of the Restriction Scheme and incidental high crude rubber prices, reclaimed rubber would have found its proper place as a compounding ingredient in rubber manufacture; nevertheless, this economic revolution did occur and reclaimed rubber has become an established fact even at low crude rubber prices.

Reclaimed rubber has been struggling along since the fifties, from the early experiments of Hiram L. Hall, at the Beverly Rubber Works, in Massachusetts, where waste vulcanized rubber was reduced to powder and subjected to treatment in boiling water. Other names following Hall in the development of reclaimed rubber are those of Francis Baschnagel and E. H. Clapp. And then came a period of intense experimentation with acids and alkalies and the patenting of numerous methods, practically all of which followed the general principles laid down by the early pioneers. A notable name in reclaimed rubber processes is that of Arthur Hudson Marks, the inventor of the alkali process which bears his name.

The Great War, with its blockade of Germany and the general curtailment of world supplies of raw rubber, fostered in the serious study of synthetic rubber in Germany and a greater use of reclaimed rubber in the United States and other countries. And then came Restriction!

World accumulation of large stocks of crude rubber from which manufacturers drew for immediate requirements postponed the economic squeeze written into the Restriction Scheme; however, the sequeeze did come and with it high prices for crude rubber, a national conservation campaign, and a more general acceptance of the inherent qualities of reclaimed rubber and its use as a rubber compounding ingredient.

A study of available United States statistics for comparative consumption of crude and reclaimed rubber, reveals the fact that reclaimed rubber had reached its lowest percentage of total crude and reclaimed consumption in 1922, which is not unusual considering the low crude rubber prices. In that year, however, on November 1, the British Restriction Scheme became effective and immediately the percentage of reclaimed rubber consumption to total consumption of both crude and reclaimed began to seek higher levels, until in the last two years the percentage of total consumption has been practically the same, at 34 per cent. The accompanying statistical table has been prepared from statistics issued by the Rubber Manufacturers Association, Inc., the Bureau of the Census, and the Rubber Division of the Bureau of Foreign and Domestic Commerce.

Comparative Consumption of Crude and Reclaimed Rubber in the United States, 1919—1928

	Crude Rubber	Reclaimed Rubber	Total	Reclaimed Percentage of Total
	Long Tons	*Long Tons*	*Long Tons*	*Percent*
1919....	202,000	74,000	276,000	27
1920....	196,000	75,000	271,000	28
1921....	169,000	41,000	210,000	20
1922....	283,000	54,000	337,000	16
1923....	320,000	75,000	395,000	19
1924....	337,000	79,000	416,000	19
1925....	388,000	137,000	525,000	26
1926....	366,000	165,000	531,000	31
1927....	373,000	190,000	563,000	34
1928....	437,000	223,000	660,000	34

The future of reclaimed rubber and its use in rubber compounding seems assured. American reclaimers generally have standardized their product, assuming responsibility for future deliveries, and rubber manufacturers are able to lay their production schedules in accordance with actual tested performances of this important rubber compounding ingredient.

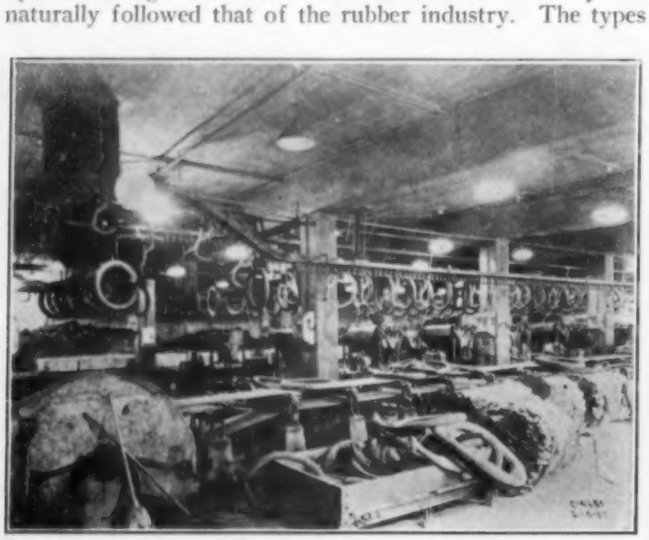
The History and Tr[illegible] RECLAIMED and S[illegible]

Basic Acid and Alkali Processes in the Ma[illegible] But Methods of Processing and Ha[illegible]

By H. A. WINKELMANN
Philadelphia Rubber Works Co., Akron, O.

THE purpose of this article is to give a brief history of what has been accomplished in the reclaimed rubber industry, from the time reclaimed rubber was first manufactured. Very little information has been published concerning improvements and changes in methods or procedures which have been adopted from time to time. The literature on this subject relates mainly to patents on reclaimed rubber, which have been frequently reviewed although but few of these patents have ever been applied on a production scale. In the present article, an effort has been made to trace the development of reclaimed rubber on the basis of actual records, or the statements of those men who have been identified with the industry. The dates of adoption of various changes in methods of processing or machinery are taken from records at hand. It is deemed inadvisable to credit any given company or individual at this time, with the earliest date for the adoption of changes in processing until all sources of information have been exhausted and such statements can be made without fear of contradiction.

A survey of the reclaimed rubber industry shows that although the basic acid or alkali processes are still in use, the methods of processing and mechanical handling have been materially improved from time to time. The development and growth of the reclaimed rubber industry has naturally followed that of the rubber industry. The types of reclaimed rubber have increased as the rubber industry has branched out and manufactured new products, thus resulting in new kinds of scrap. A reclaim made from boots and shoes was almost the only type available up to 1895. After that date, bicycle tire and hose reclaims were also available. Not long after 1900 gray auto tire reclaim was manufactured. Solid tire reclaims were manufactured about 1910 and black auto tire reclaims about 1915. The new types of reclaimed rubber usually became available within a few years after production of the new rubber products.



Conveyor System in Reclaiming Plant of Philadelphia Rubber Works Company, Oaks, Pa.

The character of the scrap has varied with changes in manufacturing methods. The introduction of organic accelerators and reenforcing pigments, such as carbon black and clay, and other refinements in compounding, produced vulcanized scrap which required changes in methods of handling and devulcanization. The improvements in the quality of rubber products were reflected in a higher grade of scrap and therefore a better grade of reclaimed rubber was possible. The use of antioxidants in rubber products since 1922 should also result in scrap which shows less deterioration.

Great Strides Made in Last Five Years

The past ten and particularly the past five years, have seen greater advances in reclaimed rubber than at any time in the existence of the rubber industry. Reclaimed rubber manufacturers are making maximum use of labor saving machinery which has resulted in lower unit costs. Improved processing conditions and methods of control of the products through the various manufacturing operations is producing reclaimed rubber of uniform quality and processing properties so that larger amounts may be used. The cleanliness and quality of reclaimed rubbers today is such that they have been adopted in constructions where formerly they could not be used at all, or at most in small amounts. It is also appreciated that the rubber compounders in recent years have indirectly furnished better scrap which is reflected in better reclaimed rubber. The rubber compounder has also learned how to compound his product to obtain the maximum value from the reclaimed rubber.

The consumption of reclaimed rubber could not have been increased without placing more rigid requirements on the reclaim as to cleanliness, quality and processing conditions. In 1920 reclaimed rubber was almost all sold as straight reclaim. In 1928 and 1929, it is safe to say that from 20 to 30 per cent of the reclaimed rubber contains

rends in the Use of SCRAP RUBBER

Manufacture of Reclaimed Are Still Used Handling Have Materially Improved

EDITOR'S NOTE: This story, by Dr. H. A. Winkelmann, has been especially prepared for this Special Reclaimed and Scrap Rubber Number and discusses authoritatively the various steps in the changes and new developments in processing and handling methods which have been the basis for the great improvement in the quality of reclaimed rubber today. It is this improved quality which has given reclaimed rubber the prominent place it now occupies in rubber compounding practice.

pigments which have been added for some special purpose. This is an approximation, since it is difficult to arrive at an accurate figure. Pigments which are added are carbon black, zinc oxide, clay, whiting, lithophone, etc. These compounded reclaims are much cleaner and may be used to advantage in tubing and calendering operations. Physical properties of the reclaim are improved and the nerve is decreased. These reclaims have shown distinct advantages in treads, insulated wire, auto topping, boots and shoes, channel rubber and tubing products of various types.

Softeners have been used to facilitate plasticization of vulcanized rubber scrap since the beginning of the industry. Changes in compounding practice have resulted in vulcanized scrap which demands the use of increased amounts of softener. Soon after 1880, palm oil, crude oil, mineral oil and coal tar were used in the preparation of boot and shoe reclaim. These softeners and later rosin oil were also used in the manufacture of bicycle tire and hose reclaim. The acid process has always used softeners to facilitate plasticization of the acidized scrap.

First Problems with Scrap

The scrap rubber which was first available, *i. e.,* boots and shoes, hose and bicycle tires, could be processed very readily without use of softener, to give plastic reclaims. The gray auto tire scrap which later became available was plasticized very readily without the use of softeners. Development of pneumatic tires using channel carbon black and organic accelerators furnished vulcanized rubber scrap which was more difficult to plasticize. With this type of scrap, the economies which could be effected by the use of softeners rapidly brought them into extensive use. Since 1915, the reclaimer has been faced with the problem of reclaiming pneumatic tires of this type. The importance of softeners for use in plasticizing this scrap gave impetus to their development and to the investigation of their properties. The development of new methods and greater speed of processing which have been made by the rubber manufacturer have led him to demand reclaimed rubbers which are particularly suited for a given process. Choice of softener plays an important part in the development of reclaimed rubber of desirable properties for each particular use.

In recent years the steam pressure used for devulcanizing has been increased from 150 to 200 pounds. The adoption of higher steam pressure has resulted in a decreased time of devulcanization with a subsequent increase in production per given unit. The possibilities in the use of still higher temperature has not been fully exploited because it is possible that the time of devulcanization may be greatly decreased by its use without deleterious effect on the product. Experiments along this line have been carried out by R. R. Gross [E. P. 297,817 (1929)] who describes a process for treating vulcanized scrap with steam at pressures of 400 to 1,000 pounds per square inch for a period of from one to fifteen minutes.

Mechanical methods of separation of fiber from ground rubber have been tried from the very beginning of the industry. About 1870-1871 E. H. Clapp removed fiber by means of an air blast. Methods for separation of the fiber in satisfactory form and finding uses for it have always interested the manufacturer of reclaimed rubber. The grade of cotton used in rubber products is such that many uses could be found for it if the rubber content can be

A Huge, Old Tire Dump in Denver, Colorado, a Scrap Rubber Collection Point

economically decreased to a very minimum. The separated fiber has always carried with it rubber particles of varying size therefore limiting its applications. There is no question but what a machine will be developed at some future date which will remove practically all of the rubber and make it possible to realize on the value of the fiber in the scrap.

The E. H. Clapp Rubber Company was organized in 1868 for the purpose of reclaiming waste rubber. The first attempts at melting or dissolving the rubber were soon abandoned in favor of grinding. The acid process for treating uncured scrap was worked out about 1870. This process was also used at about the same time by the Boston Rubber Shoe Company. Uncured shoe trimmings were reclaimed about the year 1876 by N. C. Mitchell, by boiling in an iron pot for three or four hours with caustic soda solution. The stock was dumped on a sieve, washed, pressed by hand, air dried, and shipped in barrels. After 1879, he also reclaimed shoe trimmings by acidizing, washing, sheeting, and drying in a dry room.

About the year 1879 boot and shoe reclaim was manufactured by N. C. Mitchell, by the acid process. The shoes were cracked on either corrugated or diamond rolls. Later one corrugated and one smooth roll were used since this combination gave the best results. The ground scrap was passed through a magnet four feet long by six inches wide and acidized in lead lined square wooden tanks. These tanks were three feet to four feet wide and six feet long, having a capacity of about 4,000 pounds each. The acidizing was carried out by first adding water followed by the acid and lastly the ground scrap and boiling from six to seven hours. The stock was washed from two to three hours in a round tub twelve feet in diameter provided with a stirring wheel. The mud and sand collected along the side of the tank wall. The water was drained off and the cooked rubber submitted to perforated rotaries to get rid of more water. The stock was then mixed with palm oil and mineral oil by hand and transferred to vertical heaters for 36 hours at 120 pounds steam pressure, dried on screens and sheeted on smooth mills. Reclaim devulcanized in the vertical heaters was not uniform so they were turned into a horizontal position which improved the quality of the stock.

A Typical Scrap Tire Dump at One of the Large Reclaiming Plants

A mill washed reclaim was prepared by coarse grinding, passing over a magnetic separator, acidized, washed, riffled and then devulcanized for 36 hours at 100 pounds steam pressure. Palm oil and mineral oil were used as softeners. After devulcanization, the stock was washed on washing mills and the sheets were hung up to dry. The brass was removed by hand from the dried sheets which were finally batched into slabs. It should be noted that this stock was not refined or strained.

Another shoe reclaim was prepared, using a very finely ground scrap. The scrap ground 40-50 mesh, was treated in the same manner as described above except that it was not mill washed. After devulcanization this reclaim was dried on flat screens which were heated with steam coils.

The acid process was used for devulcanizing hose, bicycle tires, and miscellaneous scrap containing fabric in 1895. The acidized stock was thoroughly washed, mixed with crude oil and devulcanized in a heater.

After 1901, a combined acid and alkali process was developed. In this process the acidized scrap was washed and boiled in a dilute solution of alkali to neutralize the acid. The stock after washing and pressing was devulcanized in a heater.

In 1905 digesters were installed with the object of replacing the heaters and eliminating the acid process. It was found that the fiber was not sufficiently destroyed in the digesters in the presence of water at 150 pounds steam pressure. The rubber was also too soft so the use of digesters was abandoned.

Boot and shoe reclaim was manufactured by the B. F. Goodrich Company in 1879. According to F. H. Mason, who entered the employ of the company in that year, this reclaim had been manufactured for some years prior to this date. The heels were chopped off by hand and discarded. The scrap was passed through a cracker and sheeted by passing through a tight mill. Any metal present in the stock was picked out by hand. The scrap was placed in pans in the heater and devulcanized for 24 hours at from 70 to 80 pounds steam pressure. By 1890 a second type of boot and shoe reclaim was manufactured, to which oil was added before it was placed in the devulcanizer. After devulcanization the stock was warmed, refined and used without stirring. This reclaim was compounded and used in the manufacture of bottle seals. There was no crude rubber used in this compound.

The above method of reclaiming is what is known as the "heater" or "pan" process. It has always been used in conjunction with the acid process for devulcanizing scrap after acidizing and washing. In recent years this method of reclaiming has been used to a large extent in the manufacture of solid tire, inner tube and fiber containing reclaims.

The alkali process of devulcanization was developed by A. H. Marks in 1898. The discovery of the fact that vulcanized scrap could be plasticized and defibered simultaneously under heat and pressure, gave new impetus to the industry. It is with the development of the automobile that the real importance of this discovery became evident. It was very quickly demonstrated that the alkali process could be operated more efficiently and more economically than the acid process. Due to differences in the character of the reclaims made by the acid and alkali process they have each found fields for which they are particularly well suited although in most products they may be used interchangeably or at most with but slight changes in the rubber compound.

Three methods of reclaiming vulcanized scrap have been in general use in the industry; heater, acid and alkali. These

methods have been repeatedly described in the literature and need not be summarized. The essential difference between them is in the process of devulcanization, although the methods of scrap preparation and handling prior to and after devulcanization are much the same; the exception being that heater reclaims are not washed and that acid reclaims unless also mill washed, are only washed after acidizing and prior to devulcanization in the heater, whereas alkali reclaims are washed after devulcanization.

In the following, the development of the various operations which are used in the manufacture of reclaimed rubber are discussed irrespective of the process of devulcanization which may be in use.

Debeading Tires

As early as 1917, tires were debeaded with a band saw using a stream of water for cooling and lubricating. Prior to that time tires were debeaded by hand. Many manufacturers were still following this method until 1919, when tire debeading machines were installed.

Chopping and Grinding

The nature of the early shoe scrap was such that some manufacturers used no chopping, cracking, or grinding rolls. The heels were chopped from the shoes using a hatchet and a wooden block. The scrap was passed through tight rolls and then depending upon the nature of the scrap, a ground scrap or continuous sheet was obtained. Corrugated or diamond rolls as well as smooth rolls were used for grinding as early as 1879. Hand chopping of scrap rubber was carried out as late as 1900. A chopper was installed about 1904. In 1912 a type of chopper still in use was installed. It consisted of a drum containing a series of radially projecting cutting knives revolving against a stationery knife. A machine having a drum composed of a large number of short cutting knives was installed in 1916. This machine produced a more finely chopped material which in some cases eliminated subsequent grinding. A hammer mill machine was also used for chopping and grinding.

Large Stocks of Old Tires at a Reclaiming Plant

Sizing

For a great many years no effort was made to size the ground scrap. Flour mill bolters were used between 1905 and 1912. These have since been replaced by various types of mechanical sifter.

Magnetic Separator

Magnetic separators have been used to remove iron and steel in conjunction with the acid process since 1878. In the manufacture of many reclaims, no effort was made to remove the metal for a long time. Magnetic separators which were really efficient and comparable with those in common use today were not installed until about 1910.

Riffler

Rifflers have been used to remove copper, brass, sand, etc., from acid stocks, since the very conception of the industry. Rifflers are inclined troughs containing a series of baffle plates which serve to hold back the foreign matter which settles as the washed stock is allowed to flow over them. This operation is in use today in both acid and alkali processes.

Devulcanizers

The first devulcanizers were heaters in which the scrap was exposed to the action of live steam. Vertical heaters were used for devulcanization as early as 1879. The latter shortly afterwards were converted into horizontal heaters. Since that time the horizontal heater has been standard equipment in the industry.

In 1898 the devulcanizer for the alkali process consisted of a heater into which were placed two closed heaters containing the scrap and sodium hydroxide solution. After closing the outer heater, steam was turned on and the scrap was devulcanized in the inner heaters.

In 1899, the rotating devulcanizer was installed, which was designed to keep the stock in motion during devulcanization. The journal on the first devulcanizer of this type was too light. A great deal of leakage was also encountered at the stay bolts. These devulcanizers were equipped with baffle plates to insure through mixing of the stock. Improved types of this devulcanizer are still in use today.

In August, 1900, the first horizontal devulcanizer equipped with an agitator was charged. One hundred and fifty pounds steam pressure was used in the jacket.

Vertical devulcanizers were developed and patented by Carleton Riddle [U. S. P. 1, 133, 821 (1915)] in 1915, and first installed in 1916. The earlier horizontal devulcanizer caused a great deal of trouble due to leaks at the stay bolts. In the vertical devulcanizer it is possible to utilize a stronger construction by using a corrugated inner shell.

Washing

Acidized scrap for many years was washed in tanks usually equipped with agitation. In most cases the stock was also mill washed after devulcanization. At present the stocks made by the acid process may be washed with the same equipment that is used in the alkali process whether the stock is subsequently mill washed or not.

The increase in production of reclaimed rubber which followed the adoption of the alkali process has gradually resulted in developing faster and more economical methods of washing to handle larger amounts of material. In 1900 one wash tank was conveniently placed to serve two devulcanizers. The alkali waste liquor was drawn off and used over again. The stock was then repeatedly washed

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Reclaim and Scrap Rubber Associations

The Rubber Reclaimers' Association

WITH the reorganization of the Rubber Association of America under the name of the Rubber Manufacturer's Association and as a result of the ruling to exclude reclaimers from the new organization, the reclaimers on June 25, 1929, formed their own body under the corporate name of the Rubber Reclaimers' Association. The first meeting, which was held in the New York offices of the U. S. Rubber Reclaiming Company.

CLARK HARRISON
President, Rubber Reclaimers' Association

With the formation of the new organization the reclaimers have once again banded themselves together in a separate association similar to the one which existed for several years prior to its absorption into the old Rubber Association of America. The new Association embraces practically all the reclaimers in the trade and is expected to render valuable services to the industry and at the same time cooperate closely with the rubber manufacturing industry. It has been thought for a long time that the interests of the reclaimers could best be served by the establishment of a separate organization similar to the one now formed.

The names of the charter members and the representatives of the respective firms who were present at the initial meeting were as follows:

Akron Rubber Reclaiming Co., Barberton, O., William Welch; Appleton Rubber Co., Franklin, Mass., P. O. Lawton; Bloomingdale Rubber Co., Butler, N. J., Clark Harrison; Boston Woven Hose & Rubber Co., Cambridge, Mass., H. S. Royce; E. H. Clapp Rubber Co., Boston, Mass., J. S. Clapp; Hood Rubber Co., Watertown, Mass., R. B. Woodbury; Pequanoc Rubber Co., Butler, N. J., Joseph F. McLean; Philadelphia Rubber Works Co., Akron, O., J. S. Lowman; Rubber Regenerating Co., Naugatuck, Conn., E. A. Anderson; Somerset Rubber Reclaiming Works, New Brunswick, N. J., Irving Laurie; United States Rubber Reclaiming Co., Inc., Buffalo, N. Y., L. J. Plumb.

The following are the present executive officers: Clark Harrison, president; L. J. Plumb, vice-president; J. S. Lowman, secretary and treasurer.

The Executive Committee which consists of five members includes the above named executives together with J. S. Clapp and William Welch.

A cordial invitation has been extended to all manufacturers of reclaimed rubber to join the Association, irrespective of whether they are subsidiaries of other companies doing a rubber goods manufacturing business or not.

For the time being the offices of the new Association are being maintained in the New York office of the Philadelphia Rubber Works Company, 52 Vanderbilt Avenue.

National Association of Waste Material Dealers

AS the rubber manufacturing industry in the United States is organized through the Rubber Manufacturers' Association and the reclaiming industry through the Rubber Reclaimer's Association, so also is the rubber scrap industry organized through the Scrap Rubber Division of the National Association of Waste Material Dealers, Inc. This division came into existence almost immediately after the formation of the parent Association and has been active and helpful ever since.

In cooperation with the old Rubber Reclaimer's Association the Scrap Rubber Division is responsible for the existing standard specifications for scrap. These classifications, but for a few changes, have been in effect for the last fifteen years.

After the Rubber Reclaimer's Association became a part of the Rubber Association of America the two organizations continued to cooperate although not to the same extent. Recently the reclaimers have again established a separate organization and will again work in close harmony with the scrap dealers.

One of the most beneficial services which the Scrap Rubber Division performed was accomplished several years ago when, at a considerable expense, it appealed to the Interstate Commerce Commission for a lower freight classification on scrap rubber. After lengthy hearings a favorable decision was rendered which gave scrap rubber in carload lots a Sixth Class rating instead of Fifth in official classification territory, thus putting scrap rubber on the same basis with other waste materials.

The present Scrap Rubber Division has over ninety domestic members and ten foreign houses. The offices of the Division are those of the parent Association in the Times Building, New York City, N. Y. The chairman of the Division is David Feinburg, president of David Feinburg Company, Boston, Mass.

The last annual meeting of the Association was held in New York at the Hotel Astor in April. The principal business transacted was the consideration of certain changes in scrap specifications involving a more careful sorting of various grades. While it was pointed out that more careful inspection would increase reclaiming costs it was felt that reclaiming processes has had been so improved that it was now necessary to have a more carefully graded raw material than formerly.

Prices on Standard Black Whole Tire Reclaimed Rubber*

	1926	1927	1928	1929
	Cents	*Cents*	*Cents*	*Cents*
January	.12	.09½	.08½	.07½
February	.11¾	.09½	.08½	.07½
March	.11¼	.09½	.08½	.08
April	.11	.09	.08½	.08
May	.11	.08¾	.08	.08
June	.11	.08¾	.08	.07¾
July	.10½	.08¾	.08	.07¾
August	.10½	.08½	.08	.07½
September	.10	.08½	.08	
October	.10	.08½	.07¾	
November	.10	.08½	.07¾	
December	.09½	.08½	.07½	

*Prices are taken from market prices as listed in THE RUBBER AGE in the issues of the 10th of each month.

World Trade *in* Scrap *and* Reclaimed Rubber

Industry is Highly Developed and Volume of Exports Has Increased Over 185 Per Cent in Five Years

By HARRY W. NEWMAN

Rubber Division, United States Department of Commerce

FROM time to time various contingencies have revolutionized industries and to a certain extent Great Britain's enforcement of the Stevenson Act of 1925, limiting the exports of crude rubber from British Malaya, entirely changed the rubber industry. The subsequent high prices of the crude product forced the manufacturers to seek some element which would relieve the high cost of production and naturally turned to the use of reclaimed rubber. The latter, however, had been known for many years by rubber chemists, but it was looked upon with prejudice not only by the consumer but by the manufacturer as well. Within this short period of time reclaimed rubber has developed a more established outlet and its consumption is now considered an economic factor in the fabrication of rubber products.

The world consumption and trade of reclaimed rubber is unavailable, owing to the failure of many countries in not separately enumerating reclaimed rubber statistics in their official exports, but from the figures at hand there were probably more than 40,000,000 pounds of reclaimed rubber exported in 1928.

The many forms of scrap, waste, and old rubber compose the important source of supply for the reclaimers and consequently the trade in this commodity has increased with the demand of reclaimed rubber. The statistics for the five principal exporting countries of scrap rubber—United States, Great Britain, Germany, Netherlands, and Canada—show an increase of 183 per cent between the years 1924 and 1928, which also indicate the trend of the reclaimed rubber industry.

Scrap Depot of Messrs. J. Schnurman, Tottenham, England

Despite the heavy decline in the price of crude rubber during 1928 upon the announcement and subsequent repeal of the Stevenson Restriction Plan, the demand for reclaimed rubber was fully maintained—in fact, it increased. During the period of high prices, manufacturers were induced to experiment with the reclaimed material and perfected it to such a degree that its use is not likely to be abandoned readily. Furthermore, manufacturers discovered that its use is not only economical in the fabrication of many rubber articles, but practical and best suited for their peculiar needs.

The reclaimers, however, have always in mind the possibility that a continuance of low-priced crude rubber may create a tendency to reduce the use of the reclaimed product and are considering the best means to develop its consumption. French reclaimers have already taken the initiative and recently held a meeting for their interests.

Not all of the scrap rubber in the open market find its way to the laboratories of the reclaimers. A considerable portion of old automobile casings is used in their present state for the making of articles such as a crude form of footwear for use in many South American and southern European countries. The inner tubes are cut into rubber bands and other objects, while solid tires are used for the making of rubber heels, bumpers, and the like.

The United States, according to the official census of 1927, produced 330,435,663 pounds of reclaimed rubber for sale, and exported 19,130,429 pounds. The former figures, however, do not include the many thousands of pounds of rubber which were reclaimed at the factories of the large manufacturers for their own use. Such figures are not available, consequently the total production of reclaimed rubber in the United States is far in excess of the amount which was sold on the open market. Small quantities of reclaimed rubber are imported into the United States, especially a special French reclaimed product which is imported at the rate of several tons per month.

The United States is maintaining its lead in the exports of the reclaimed product, the figures for the first half year of 1929 showing an amount in excess of 70 per cent of the total exported for the previous year. Canada in 1928 took 82 per cent of the United States total exports of reclaimed rubber, and Great Britain—the only other important outlet—took 12 per cent of the total.

The United States draws the bulk of its export trade in scrap and old rubber from the 73,890,000 automobile tires which are annually discarded. Added to this is a smaller amount of bicycle and motorcycle tires, as well as rubber

Exports of Scrap and Old Rubber

(Pounds)

Country	1924	1925	1926	1927	1928
United States	21,451,849	30,951,479	29,842,702	31,332,132	45,325,150
Un. Kingdom	8,259,500	18,298,300	19,220,600	21,410,200	[1]24,193,875
Germany	1,421,967	2,128,844	7,254,025	4,956,355	6,988,000
Netherlands	1,289,325	2,911,962	3,716,588	4,842,446	7,676,532
Canada	2,458,100	12,558,300	13,068,300	12,623,500	14,793,200
Finland[2]	169,785	128,619	238,841	154,666	[3]
Sweden	480,454	1,190,275	589,052	1,002,772	1,388,130
South Africa	36,146	5,964,685	1,158,422	13,665	[3]
Estonia	760	12,878	95,700	.....	[3]
New Zealand	9,300	83,100	.....	.....	[3]

[1]Estimated. [2]Includes also reclaimed, if any. [3]Not available.

shoes, belting, hose, and miscellaneous rubber debris.

In 1928 the United States placed 45,325,000 pounds of scrap rubber in other countries divided among 26 markets. Spain was the United States' best outlet in 1928 with 12,414,000 pounds, followed by Germany with 8,547,100 pounds, France 7,496,000 pounds, and Canada 5,300,000 pounds.

Exports of Reclaimed Rubber

The following table shows the trend of exports of reclaimed rubber during the past five years from the countries which separately enumerate reclaimed rubber in their trade statistics.

Exports of Reclaimed Rubber

(Pounds)

Country	1924	1925	1926	1927	1928
United States	5,458,157	10,239,876	12,075,640	19,130,429	21,452,956
United Kingdom	816,400	3,574,900	4,582,500	5,680,900	[1]8,064,625
Italy	180,948	323,768	236,710	1,098,694	297,540
Netherlands	3,218	15,686	6,065	130	2,204
Sweden[2]	11,392	604	4,259	17,632	31,411
Poland	.....	.....	.....	3,306	([3])

[1]Estimated. [2]Includes crude rubber if any. [3]Not available.

NOTE: *In 1927 Germany exported 1,958,254 pounds and in 1928, 3,071,054 pounds of rubber paste, reclaimed rubber, rubber sheets with wire, and the like. No definite information is obtainable as to what portion of the above comprised the reclaimed product, but it is believed that fully more than 95 per cent comprised the rec ai product. France in 1928 exported 21,481,500 pounds of crude rubber which includes, besides reclaimed rubber, a certain amount of old and scrap rubber.*

French Industry and Trade

The high prices of crude rubber also gave an impetus to the reclamation of scrap rubber in France, and since then the market has been most active. Inasmuch as the domestic supply of scrap rubber is inadequate for the national requirements, large quantities are imported—principally from the United States. Great Britain is the second foreign source of supply and Germany probably occupies third place. The recent failure of a large German reclamation plant has directed extra quantities of old rubber from Germany into France. Local customs statistics do not distinguish between the crude and the used article, so that import figures, either in the aggregate or by countries, can not be given.

Owing to the increased production in the past three years, the supply of reclaimed rubber from domestic sources is more than adequate for the French demand and augmented quantities are exported. From estimates made by leading producers, the annual production approximates 9,000 metric tons, or about 30 tons per working day. In addition, large manufacturers such as Michelin, Hutchinson, Dunlop, and others have their own plants for reclamation operations, the production totals of which are not available.

Industry Centered in Three Concerns

The NaOH process is used practically by all rubber reclamation units in France. Economy in production is favored by low wages. The three most important rubber r claiming factories in France—aside from those attached to rubber manufacturing plants—are Gabriel Wattelez Colombes, the Société Industrielle du Caoutchouc R généré at La Courneuve, and Le Caoutchouc Regénéré at Clermont-Ferrand. By far the largest plant is Wattelez which reclaims about 60 per cent of the total quantity r generated in France, the estimated output being 11 ton per day.

About 80 per cent of the reclaimed rubber consumed i France is regenerated locally. Shipments from the Unite States to France are small, the 1928 figures being 23,348 pounds, valued at $1,907. Receipts from Great Britain probably exceeded this quantity. There are no appreciable imports from other countries.

A considerable part of the rubber regenerated in France is exported and the industry is depending more and mor

Salvage Dump of the 26th Division in France During the War

upon foreign markets. The United States takes special quality product, but the more important customers are Great Britain, Spain, Italy, Germany and Belgium.

German Market Dull

An active demand previously existed in Germany for reclaimed rubber, inasmuch as the country is a large manufacturer of rubber articles and the domestic supply of scrap and reclaimed rubber was never sufficient to fulfill local requirements. Since the low prices of crude rubber, the rubber reclaimers have been obliged to live on their sidelines in order to survive. The most outstanding case is that of the Runge Werke, G.m.b.H., of Berlin-Spandau. This concern formerly supplied approximately 20 per cent of the entire local consumption, but at present it has shut down to await better times. Its output, prior to the slump precipitated by the withdrawal of the Stevenson Scheme amounted to 350 tons monthly.

Apart from the difficulties of the Runge Werke, reclaimed rubber has not lost favor altogether among the consumers. The Continental concern of Hanover has rebuilt its own reclaimed factory and is organizing that of its subsidiary, Excelsior, to enable it to produce by the end of 1929 all the reclaim required by that company.

Germany buys scrap and waste rubber from a number of sources, but chiefly from the United States and Great Britain, the former furnishing the more important amounts. During 1927 Germany imported 17,739,996 pounds of scrap and waste rubber, which increased in 1928 to 17,907,500 pounds. The United States supplied 48 per cent and the United Kingdom 26 per cent.

The exports of reclaimed rubber from the Netherlands are small, inasmuch as the greater portion of the domestic

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The Collection of and Trade in Scrap Rubber

Begins With the Peddler's Cart and the Junk Dealer—Proper Grading of Scrap Highly Important—To Avoid Disputes on Quality is One of the Greatest Problems of the Industry

TRADING in scrap rubber is naturally closely linked up with the rubber reclaiming industry. Reclaimed rubber has steadily grown in popularity especially as its product has been constantly improved upon and as the manufacturer has gradually learned to use it more widely and in greater amounts. This accounts for the present day large rubber reclaiming industry. The needs of the latter call for vast quantities of scrap rubber.

The collection of scrap rubber entails considerable work and involves many complications. The so-called "peddler" who, incidentally, is frequently financed in advance by the larger dealer, canvasses his community with a push-cart or at best a horse-drawn wagon gathering from garages, business houses, residences and so on, their accumulation of waste rubber together with other discarded material. These daily accumulations he takes to an established junk dealer in his vicinity who accumulates tonnages sufficient for trade handling.

Baling Scrap

The large dealer or wholesaler who supplies the reclaimer keeps in constant contact with these junk dealers by letter, telegraph, telephone and personal representatives. This is done to keep the junk dealer posted as to the fluctuation of market values and to inform them of the reclaimers' requirements respecting grading, quality, sorting, packing, etc.

The traders' most important function is as a financially and morally responsible agency in whom the reclaimer can have full confidence. He must be in a position to supply large quantities of any specified grade of waste rubber in regular shipments so that the machinery of the reclaiming plant may operate without interruption and with a minimum amount of congestion due to irregular shipments.

This necessitates a staff of men and women specially trained to handle this commodity. It not only requires experts in grade and quality but must have a large staff of people to handle the routine details such as invoicing, handling of documents and all the problems which confront any trading establishment. In order to obtain the lowest possible freight rates, men expert in railroad and steamship traffic must see that material is routed and loaded so as to obtain the ultimate advantage of commodity rates. Freight rates play an exceptionally important part and require careful attention by a competent traffic force. Most shippers prefer to sell FOB. cars their own city whereas the mills buy delivered cars at their reclaiming plants. The traffic department therefore, must accumulate for quick reference data as to the prevailing carload and less carload freight rates applying to the various consuming points and furnish information as to the prevailing minimum carload weight, the proper routing and manner of packing. Much attention must also be paid to the movement of cars in order that deliveries be affected as speedily as possible and demurrage avoided.

The great majority of scrap rubber is shipped to reclaiming mills in this country. A considerable quantity of scrap rubber tires are used by "tire manipulators." These manipulators sort out tires suitable for re-treading and repairing. They also remove the inside fabric of suitable tires for the purpose of manufacturing patches and reliners which are used in temporarily repairing damaged auto tires. The parts of the tires not used in this process of manufacture are sorted and sold as special grades of waste rubber for reclaiming purposes.

When buying from reliable dealers the customary terms are 75% cash against invoice and bill of lading, balance after receipt and verification by the consuming mill. This means that the final payment is made subject to the consumer's report as to weight and quality. This matter of mill reports governing payment is a serious subject and requires much attention. The most difficult part of the traders' work consists of the adjustment of disputes arising from the reports on weight and quality rendered by reclaimers. Although there are recognized trade rules governing the manner of shipping, packing and quality, there are some mills which are more exacting than others in their examinations. This is frequently the cause of much trouble in convincing the shipper that the mill's report is correct.

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Reminiscences *of an* Old Timer *in the* Reclaimed Industry

By L. J. PLUMB

President, U. S. Rubber Reclaiming Company

WHY I should have been selected to write the reminiscences of an old timer as a contribution to a symposium of reclaimed rubber was a mystery to me until I recalled an expression frequently used by a *real* old timer—since passed on—whenever he wished to impress us youngsters with the weight of his knowledge and experience, to wit, "I have been in this business over twenty-five years, etc." With a shock at the realization it dawned upon me that the year 1904 was just twenty-five years ago. There are a number of older "old timers" still plugging away in the manufacture of reclaimed rubber, any of whom could have done better justice to the subject. My reticence at undertaking such a task is further intensified by the knowledge that the long-suffering public has been over-burdened with reminiscences. Automobile manufacturers, steel magnates, oil kings and white hopes have been ready to load us with their experiences.

L. J. PLUMB

I obtained my first and only job in the rubber industry back in 1904. Frank H. Brewster was acting as general superintendent of our plant at Buffalo, after having had a great many years' experience in the manufacture of rubber mill machinery. He has supervised many of the first installations of machinery in what are today the leading plants in the rubber industry. Chemists were few and far between in those days, and their importance to reclaiming was not then appreciated. About the first job we tackled was the question of sulphuric acid. It was found we had been paying about 10% more than stipulated in the contract by "mistake." It was promptly acknowledged by the supplier, satisfactory rebates made, and ensuing deliveries kept up to standard. The amount realized from this little experience so encouraged the management that immediately wider fields were opened for technical work. Problems appeared for solution like weeds, and it was not long before the chemical laboratory in the reclaimer's plant attained the position of importance that it warranted.

One of the problems of particular interest to present day arid America was the trouble encountered in using reclaimed beer bottle stoppers. Do you remember the old-fashioned wire stopper on the dark brown bottle which you had to push with your two thumbs until they were black and blue and then PLUP!!!—the contents were released with a rush? Well, the plug was made of a compound consisting of a little crude rubber, much shoe reclaimed and some fillers. A liberal dosage of sulphur was employed in those days in all rubber compounds, and of course some of the bloomed out sulphur crystals got into the beer. Frequently the compounds contained factice or substitute. This reacting with the hot sulphuric acid during defiberizing process, produced chemical compounds having wild smells and tastes which in turn affected the contents of the bottle. About the time we licked this problem, along came the simple crown cork made of metal, and we had the solution as our sole reward.

One of the most frequent visitors to our plant to intimidate us was the old bogey-man, SYNTHETIC RUBBER. In many a form has this "old man of the sea" made his appearance to skeptical reclaimers. I recall one in particular, I think during the spring of 1905. Magnificent heels were shown to demonstrate the product. Crude rubber was then selling at about 75 cents a pound, and this synthetic rubber, it was said, could be made cheaper than the best grade of reclaimed. The heels smelt, felt, tasted, wore and tore like the best grade made from crude. The enterprise obtained capital and was going along well until one fine day a shipment of Para biscuits was delivered at the wrong time—to the stockholders' benefit and the inventor's chagrin. Since then there have been repetitions of a like character. History is anything but novel. Only last week there came to my attention a situation which has all the earmarks of our old synthetic friend of 1905.

As early as 1900 experiments were being made with the guayule shrub and in 1906 there were respectable quantities imported from Mexico. It was not unusual to have rubber go as high as a dollar a pound. In 1907 it reached $1.30 and in 1910 hit $3. These advances frequently created renewed interest in synthetic rubber and substitutes for Para. Mr. Edison's current studies were anticipated fully twenty years ago. I believe he is reported to have found traces of rubber in over fifty plant indigenous to this country. At one time rabbit weed managed to get itself on the front page of the daily papers, and I think it was another contemporary rubber trade paper which published a proposal of one

genius who had worked out a theory to raise thousands of female goats in sections of the United States where rabbit weed is obtained. These goats, fed on the weed, were to be milked every night and the rubber obtained from the so-called goat latex. Further improvements in his procedure were to mix with the rabbit weed diet foods rich in sulphur, and run the milk direct from goat to mold for curing. Surely this antidates Dr. Schidrowitz's cured latex by many years.

But reclaimed continued to withstand the tests of synthetic rubber just as it did the onslaughts of 12½c plantation smoked sheets. The year I joined our company, there were produced forty-three tons of plantation rubber, thirty thousand tons of Brazilian and thirty-two thousand and seventy-seven tons of so-called wild rubbers. The latter were well named. They were indeed wild, and many a poor compounder I have seen with a wild look in his eye in trying to get a uniform product from them. The sinking of a vessel in the Amazon or a delay of arrival would be apt to have a marked effect upon the market for crude rubber and in turn the reclaimed market also. We did not have wireless or radio in those days, so that rumors could be capitalized upon to better advantage than under present conditions.

Scrap Dump at a Collection Depot

The founders of our company had been manufacturers of reclaimed rubber for over twenty years prior to my time, and I have heard many an anecdote illustrating the conditions existing in the industry during the golden nineties. One of these which always gave me particular amusement was the experience of a prominent reclaimer with the late Joseph Banigan. Our friend was very anxious to sell the Banigan Rubber Company a substantial volume of stock. They were prosperous manufacturers and it would have given him considerable prestige to have them as an account. Knowing they were in the market for shoe stock, he hurried to New England with the knowledge that certain expected arrivals of crude rubber had failed to be reported, and the market was correspondingly firm. He therefore quoted Mr. Banigan a pretty good price, but was unable to sell him. Both men were very shrewd traders, and Mr. Banigan countered with an offer on a substantial quantity.

After considerable dickering our friend decided it was better psychology to leave Banigan without making a sale, and returned home to find that the rumors of disaster to the ship heavily loaded with Para were false and the market was receding. After a conference with his associates he rushed back to New England the next day, entered Banigan's office and agreed to accept his offer of the day before. Banigan shook his head and with a smile said, "Oh, no! That offer is not good today. Yesterday I was an anxious buyer, but you were an unwilling seller. Today I am an indifferent buyer and you are an anxious seller. My price on a quantity is so much"—naming a substantial reduction from the former price. Our friend was very much chagrined and despite his most heroic efforts was unable to make a trade. He rushed back to confer with his partners, and after a hurried deliberation they decided to accept it. The third day found him again in Mr. Banigan's office ready to accept the offer. "Oh, no!" said Mr. Banigan. "Today you are a most anxious seller and I am a most indifferent buyer. My price today is so much," naming a further drastic cut. I do not recall whether this experience was gone through a fourth time, but eventually the order was taken at a price which admittedly reflected no profit. It was then necessary to find ways and means to get out at least with a whole skin. This was before the days of telephones, chemical control, specifications, and other safeguards. They found that they could shorten up on the drying time a little bit and in so doing leave a little moisture in the reclaimed, thereby reducing the cost. The first car or so went through all right and with this success they grew bolder until carloads went to Banigan Company fairly reeking with moisture.

Towards the end of the contract, a request came from Mr. Banigan to call upon him. Sensing the possibility of a new contract, he immediately went to New England, was greeted most cordially by Mr. Banigan and after customary preliminaries they got down to business. Instead of a new contract, however, the subject under discussion was the old one. Banigan opened the argument with the remark, "When we purchased reclaimed rubber from you, we did not expect to get carloads of water. We find that you have delivered to us so many pounds of nice Jersey water. Now we have plenty of water here and it costs us practically nothing, so we cannot afford to pay you for the Jersey variety. We have estimated the quantity that you have shipped to us in place of reclaimed rubber, and shall expect you to deliver its equivalent in good dry reclaimed." The market meanwhile had advanced substantially and the outcome of the transaction was far from profitable.

He used to enjoy telling this story as an illustration of conditions prevailing at that time, and of the extreme shrewdness and ability of the late Joseph Banigan. I have quoted it here to show the impossibility of such a situation existing under current practice. Specifications as they are drawn today would not permit the slightest approach to such a condition. Of course, it would have been physically impossible to manufacture reclaimed rubber in those days to conform to the narrow tolerances that are common today. We used to make many tons of a grade known as Victoria. It was made entirely from boots and shoes. The devulcanized powder was

(*Concluded on page* 562)

Reclaiming Plant of the Goodyear Tire & Rubber Company, Akron, O.

The Reclaimed in the UNITED

Short Sketches of the History and Plants Now Producing the 250,000 Constitutes the Present

THE growth of the reclaimed rubber industry in the United States since its inception in about 1900 has been one of the phenomenal stories in business romance. Its rise has been steady and was considerably accelerated in 1922 by Mr. Hoover's plea for a conservation of crude rubber, a plea that came as a result of the famous Stevenson Restriction Act on the part of Great Britain. With the finding that reclaimed rubber had a very definite place in general compounding practice, reclaimed finally "came into it's own" and has now established itself permanently in the rubber goods manufacturing industry.

Last year the combined output of American factories totaled 208,516 long tons and the amount consumed totaled 223,000 tons, which actually represented a proportion equal to 45.4 per cent to the total tonnage of crude rubber consumed over the same period. The percentage this year to date has been a trifle less due primarily to the long existing low price for crude rubber but the loss in percentage has been more than made up in volume of reclaimed used due to the unprecedented unit volume in the production of rubber goods which has prevailed over the last eight months.

The following brief histories of the leading companies in the reclaiming industry will attest to the importance and growth of this branch of the general rubber industry.

Akron Rubber Reclaiming Company

The Akron Rubber Reclaiming Company was organized in 1924, starting operations with a capacity of 10 tons of finished product daily. In 1926 the capacity of the plant was increased to 25 tons a day, and in 1928 this capacity was increased to 50 tons a day through the building of the Midwest Rubber Reclaiming Company at East St. Louis, Ill., which company is controlled and operated by the Akron company. Both plants manufacture a complete line of tire and tube reclaims.

The officers of the Akron company are J. B. Huber, president; William Welch, vice-president and general manager; R. J. Houston, secretary and treasurer. The Midwest company has the following officers: William Welch, president; S. G. Luther, vice-president and general manager; W. A. Hart, secretary and treasurer.

"The best available statistics show that approximately 34,000 long tons of reclaim were used in 1920 and that this was increased to 208,000 long tons in 1928," writes William Welch, vice-president. "While the high price of crude rubber during a part of this period had much to do with the increased use of reclaimed rubber, we feel that probably a still more important factor is that reclaimers generally have so improved their product as to permit of it being used in larger quantities and in products where previously it could not safely be used. Looking to the future we believe that the reclaiming industry will establish its own market limits.

"The growth of the company from a 10-ton capacity in 1925 to 50 tons per day in 1929 can, in our opinion, be traced directly to the fact that we have put special emphasis on research work and have attempted to sell only such reclaim as can safely be used in large quantities without the danger of impairing the quality of the finished product."

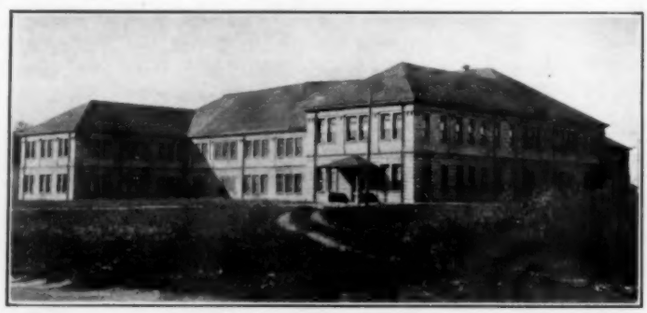
Appleton Rubber Company

The Appleton Rubber Company, Franklin, Mass., manufacturers of reclaimed rubber and frictioned tape, dates back to 1898 to the old concern of F. H. Appleton & Sons, who started in business at the present location during that year. Its founder, Francis H. Appleton, and his son, Francis H. Appleton, Jr., were well known figures in the rubber trade, and for many years were very successful in manufacturing white reclaims. In 1920 the name was changed to the Appleton Rubber Company, and the founders ceased to take an active part in the business.

Late in 1926, H. O. Phillips, former head of the Phillips Insulated Wire Company of Pawtucket, R. I., was elected president, with the following officers: J. E. Cameron, treasurer and general manager. Paul O. Lawton, secretary and assistant treasurer, and Robert Cowen, factory manager. Shortly afterwards the plant was destroyed by fire, but has now been rebuilt in a modern up-to-date building, fully equipped to reclaim inner tube and tire scrap by the alkali process. In August, 1927, the tape department started production, and the volume of both reclaim and tape is reported to be very large from this well managed company, which has a record of over 30 years of continuous operation.

Bloomingdale Rubber Company

The Bloomingdale Rubber Company is the second oldest reclaiming company in the United States, having been founded in 1879 at Butler, N. J. In 1916 the reclaiming plant of the S. & L. Rubber Reclaiming Company at Chester, Pa., was purchased as an additional plant. The company makes a specialty of reclaiming inner tubes of automobiles and were the first manufacturers to put on the market what is known as high tensile reclaim. They first made



Barberton Plant of the Akron Rubber Reclaiming Company

Rubber Industry STATES Today

Activities of the Leading Reclaiming Tons of Reclaimed Rubber Which Output of American Plants

a high tensile reclaim in 1921, having a tensile strength of 1,800 pounds, whereas the highest tensile obtainable at that time was only from 600 to 700 pounds. They are also manufacturers of rubber heels in which they use their high tensile reclaim. Clark Harrison is president. The executive offices of the company are at 501 Fifth avenue, New York City.

New Jersey Rubber Company

The New Jersey Rubber Company, Lambertville, N. J., was organized in May, 1890, by Peter V. Voorhees, Camden, N. J., president and treasurer; Edward R. Solliday, Lambertville, N. J., general manager; and Spencer M. Alpaugh, Trenton, N. J., secretary, and incorporated May 29th, 1890.

A property, situated between the Delaware River and the feeder of the Delaware & Raritan Canal, and about two blocks north of the railroad station in the city of Lambertville, N. J., was purchased from the estate of William Cowin. The interiors of the buildings were remodeled to accommodate the type of machinery necessary for the manufacture of reclaimed rubber, a large water wheel was also installed, and the newly launched company started on its business voyage.

Mr. Alpaugh died in 1893 and his interest was purchased by Messrs. Voorhees and Solliday. In January, 1906, Mr. Solliday became the sole owner by the purchase of Mr. Voorhees' half interest.

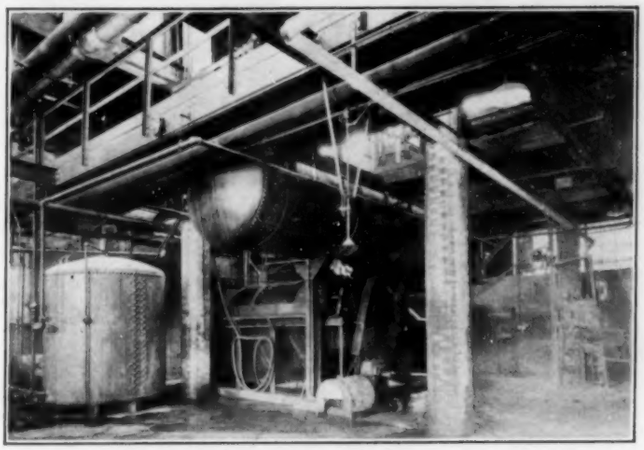
June 11, 1909, the plant was bought from Mr. Solliday by Messrs. E. H. Clapp, George A. Clapp and John S. Clapp of Boston, Mass., who still own and control it.

The present officers are: President, George A. Clapp; vice-president, John S. Clapp; treasurer, Eugene H. Clapp; secretary and superintendent, Charles M. Dilts.

Since its organization the plant has steadily grown in size, adding from time to time improved types of machinery, thus keeping pace with new methods, and its increasing output.

At present, and for some years past, it has specialized in rubber for cloth proofing, and wire insulation, and is enjoying a position of prominence in the industry.

Midwest Rubber Reclaiming Plant, East St. Louis, Ill.



Magazine Into Which Devulcanizers Are Discharged at Endicott-Johnson Plant. Sargent Dryer in the Foreground

Pequanoc Rubber Company

The Pequanoc Rubber Company was incorporated in the year 1901 under the management of Joseph F. McLean, and a factory built in Butler, N. J., for reclaiming scrap rubber.

The process adopted at that time was chiefly mechanical and was used in the reclaiming of boots and shoes and other grades of scrap offered during that period. They began with a capacity of 2 tons of rubber per day.

The company developed a line of standards by a process which produced an unusually clean product, and they made a specialty of co-operating with the insulated wire industry of the country in working up such standards as would fit in their formulae. As they expanded they found a ready market for their different grades in auto topping, hard rubber and other lines.

Today they are using a combination process and have developed a factory with a daily capacity of 75 tons. They manufacture over forty different grades of reclaimed rubber and are constantly adding new standards to meet various special requirements.

Mr. J. F. McLean, the founder of the company, is still the president and is one of the most active members of the company, acting as an inspiration to all who work under him.

The other officers and personnel of the company are as follows: Wm. W. Weitling, vice-president; David D. Smithyman, secretary and sales manager; M. T. Gunter, treasurer.

Rubber Recovery Company

The factory of the Rubber Recovery Company is located at 71 Wigley avenue, East Akron, Ohio, having excellent railroad facilities and good paved roads for motor trucking, this proving very important for both the receiving of raw material and the shipment of the finished product.

They produce several special brands of reclaimed rubber, using two major processes that have proven most satisfactory for the production of both the staple whole tire reclaims as well as the special kinds found advantageous by their clientele.

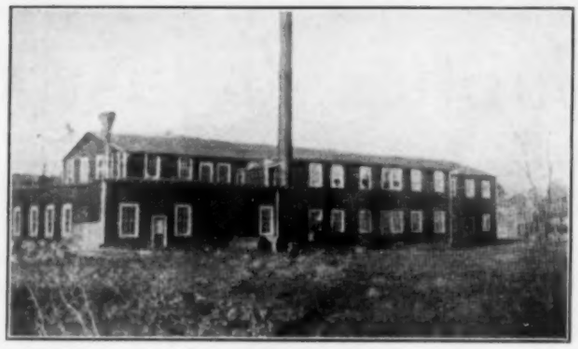
The organization is as follows: E. H. Trump, president; W. Bacon, secretary; R. M. Trump, treasurer; E. W. Derr, general manager; C. E. Bishop, factory manager.

The sales activity is handled through the F. F. Myers Co., Akron Savings & Loan Building, Akron, Ohio. The factory is well equipped and being constantly improved in order to produce more economically and with better control of the process methods, installing modern machinery and equipment whenever the results of research development work proves it to be advantageous.

A modern testing laboratory is maintained and facilities are provided for assisting the clientele in working out problems of compounding.

The capacity of the plant varies with the nature of the reclaims

Rear View—Pequanoc Works



First Plant of the Pequanoc Rubber Company, 1901

produced. Higher grades are specialized in. A close monthly average would be 650,000 pounds.

"The management believes," writes C. E. Bishop, factory manager, "that although at the present time reclaimed rubber is selling for less than its real value (especially the higher grades) eventually the true value of these reclaims will be appreciated and the demand will justify a price more consistent with real values.

"Constant striving to produce reclaims that are better and more dependable as proven by thorough research work on both raw materials and process methods is the objective of this enterprise and we are proud to be a part of all we have met."

E. H. Clapp Rubber Company

The business, now conducted by the E. H. Clapp Rubber Company, had its inception in 1868. The company was the first to make a commercial success of reclaiming waste rubber, furnishing a product suitable for extensive use in manufacture of rubber goods.

Eugene H. Clapp, with the assistance of his cousin, Fred W. Clapp, and Leander R. Streeter, conceived the idea of melting or dissolving old rubber, but after some experimenting came to the conclusion that the best way to reclaim rubber was to grind it. The idea, first considered absurd, was developed on the property of a Mr. Perkins who had a grist mill located on the Mill Damn in the south end of Boston where he ground corn and other cereals with mill stones. The success of these experiments is now known.

The company's mill was later established on a historic site at Luddan's Ford, at Hanover, Massachusetts.

The plan of removing fibre from ground rubber by means of an air blast was later discovered, which made it available for uses for which it had been unfit before.

It was found to be impossible to reclaim uncured friction by the air process and, after experimenting with various agents, sulphuric acid was adopted as the best means of reclaiming this kind of scrap. This was the beginning on a commercial basis of the so-called acid process.

In 1881 the factory building was entirely destroyed by fire. Mr. Clapp immediately constructed a much larger mill and repeated additions have been made until the present establishment covers several acres, partly in the town of Pembroke.

After the death of Eugene H. Clapp the business was incorporated as the E. H. Clapp Rubber Company with George A. Clapp as president and Arthur W. Clapp as treasurer. After the death of Arthur Clapp in 1907 the management was taken over by Eugene H. Clapp, Jr., the son of the founder of the company, who is now its treasurer. George A. Clapp, son of the first president of the corporation, is now holding that office.

The company employs about 400 operatives, and manufactures extruded and molded rubber products as well as reclaimed rubber.

Gutta Percha and Rubber, Ltd.

The first plant for manufacturing rubber goods in Ontario, Canada, commenced operations in 1883 in Parkdale, then a suburb, now part, of the City of Toronto. The company was incorporated under Ontario charter as The Gutta Percha & Rubber Manufacturing Company of Toronto, Ltd., and was at that time a subsidiary of The Gutta Percha & Rubber Manufacturing Company of New York.

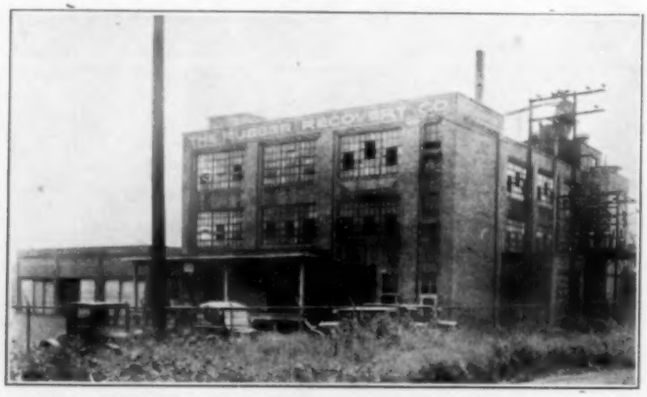
In 1887, the late H. D. Warren acquired a controlling interest in the company, and shortly thereafter all the remaining interest of the New York shareholders. The business thus became, and still remains, entirely Canadian owned. In 1912 the company was reorganized, its capital structure enlarged, and under Dominion charter its name was changed to Gutta Percha & Rubber, Limited.

It first manufactured mechanical rubber goods only. Later footwear and waterproof clothing were added, and in due course bicycle and automobile tires. Clothing and bicycle tires were subsequently dropped to permit expansion in other lines.

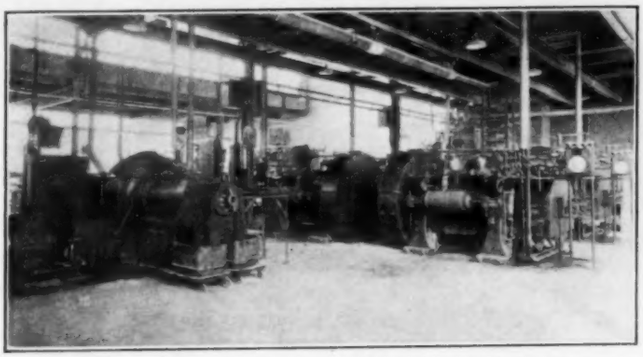
Mr. Warren early foresaw that the industry must be developed by scientific methods. This led him to establish a reclaiming plant and a chemical research laboratory as part of the enterprise. Both have been in operation for upwards of forty years. The laboratory was one of the first, if not the first, to be established in a rubber factory on this continent.

The company uses practically its entire output of reclaims in its

Front View—Pequanoc Works



Plant of the Rubber Recovery Company, East Akron, O.



Endicott-Johnson Plant—Section of Mill Room

Endicott-Johnson Plant, at Johnson City, N. Y.

own works. Various reclaiming methods have been employed, including the acid, alkali, and several mechanical processes.

H. D. Warren, Sr., died in 1909. His eldest son, Trumbull Warren, killed at Ypres, succeeded to the presidency in 1912. After his death, C. N. Candee, who joined the organization in 1886, became president. The other officers are: S. T. Warren, vice-president; C. S. Band, vice-president; H. D. Warren, secretary; F. A. Warren, treasurer; J. H. Coffey, Jr., managing director.

The company has subsidiaries in London, England; Copenhagen, Denmark, and many branches in Canada.

Goodyear Tire and Rubber Company

The reclaiming plant of the Goodyear Tire & Rubber Company, at Akron, was placed in operation during the spring of 1917, not as a profit-making enterprise, but simply to meet the demands of their own compounders for a satisfactory rubber substitute with chemical and physical properties which would permit its economical utilization in the manufacture of pneumatic tires and mechanical rubber goods.

Originally, the plant was operated at 15 tons per day of whole tire reclaim, requiring under the operating condition of that day, 210,000 square feet of floor space. At the present time the plant produces 100 tons per day on a floor space of only 250,000 square feet.

This great reduction in floor space per ton has been brought about partly by improved equipment methods, and higher unit efficiencies. The largest single item in this change, however, has been the substitution of a single whole tire reclaim for the 9 or 10 special reclaims formerly made. These special reclaims were apparently necessary, but recent compounding developments have shown the applicability of one whole tire reclaim.

There still are a few small tonnage special reclaims made from inner tubes, solid tires, and airbags, serving special mechanical goods requirements and utilizing certain wastes.

Endicott Johnson Corporation

In keeping with the fixed policy of the Endicott Johnson Corporation, Johnson City, N. Y., to make as many of the basic materials as possible which are used in their manufacturing processes, they built a reclaiming plant, feeling that they would also be able to eliminate a great many of the costs incurred by other reclaimers, such as freight, sales expense, etc. They also felt that they could develop reclaims which would better fit in with their own ideas on compounding than the reclaims which were being offered for sale, due to the fact that they could make special reclaim for a special work rather than to make some reclaim which was more or less general in purpose.

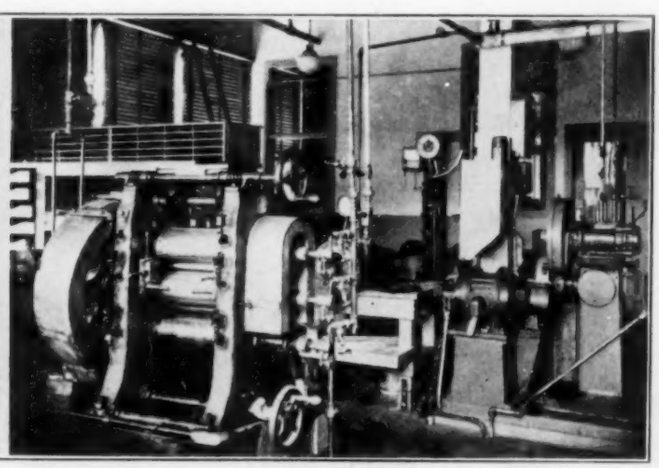
The company are making two reclaims—a whole tire reclaim with an average tensile of from 1,000 to 1,200 pounds and with an elongation of 500 per cent, also a high-tensile tube reclaim which we are using mostly in heels. They are making tire reclaim under the brand Iroquois and tube reclaim under the name Hercules.

H. E. Christfield is manager of the Endicott Johnson Rubber Division, which includes this plant and L. F. Bass is superintendent.

The development of reclaims at the Hood Rubber Company, Watertown, Mass., dates back to about the year 1905. At that time work was being carried out on an acid reclaim and considerable quantities of reclaim were made by acid process at about that time. In 1910 other work was carried out in deresinifying Pontiac and attempts were made to produce reclaimed rubber from tires by a number of novel methods. Large scale production of reclaim however, did not materialize until some years later when it was decided to go into the alkali process of reclaiming. At the present time, practically all of the reclaim made at this plant is made from pneumatic tires, solid tires and inner tubes, the caustic process being the general method used.

Other reclaims are made but these in general are for the pur-

Chemical Laboratory—Pequanoc Plant



Section of Physical Testing Laboratory at Same Plant

U. S. Rubber Reclaiming Plant, Buffalo, N. Y.

pose of working off scrap and would not find any general classification among commercial reclaims.

The early work on production of reclaimed rubbers was under W. W. Duncan and later developments have been carried out by Dr. C. P. Flora, R. H. Blanchard and H. B. Leland. At the present time the reclaiming plant is under the direction of Mr. Leland.

Philadelphia Rubber Works Company

The company was established as early as 1880 at Akron, O. They have comparatively recently established another plant at Oaks, Pa., which is a model of efficiency in layout. The company is probably the first to begin production, through its subsidiary, Dispersions Process, Inc., of aqueous dispersed latex from reclaimed scrap. In addition to a large trade in the general line of high grade reclaimed, the company has been very successful in developing a field for the dispersed latex and new applications for it are being found in a number of rubber manufacturing fields.

J. S. Lowman is president and R. S. Rauch is vice-president. Mr. Rauch is also the leading executive in the Dispersions Process Company.

Somerset Rubber Reclaiming Works

As manufacturers of high grade reclaimed rubber this company has been in business for many years. Their factory is at East Millstone, Somerset County, N. J. The executive offices are at New Brunswick, N. J. The company has specialized in the manufacture of light colored reclaimed rubber and other high graded stocks. They also manufacture a high grade of hard rubber dust for use in the fabrication of hard rubber goods.

Boston Woven Hose and Rubber Company

The Boston Woven Hose and Rubber Company, at Cambridge, Mass., has maintained a reclaiming plant for its own compounding for several years and in fact was the first company to develop the alkali process of reclaiming. They do not, however, sell their output but manufacture solely for their own consumption. At the present time they are moving their reclaiming plant from the old location at Plymouth, Mass., to the property recently acquired adjacent to the Cambridge plant. The company has been one of the most prominent in the field of rubber research. The present factory manager, John M. Bierer, has been an important contributor to the subject of rubber technology and is the inventor of the Bierer bomb for ageing tests on rubber compounds.

Reclaiming Department, Gutta Percha and Rubber, Ltd.

U. S. Rubber Reclaiming Company

The U. S. Rubber Reclaiming Company had its beginning at Creskill, N. J., in 1883. Shortly thereafter it moved to Derby, Conn., and thence to Buffalo, in 1902 where it enjoyed the advantages of a better geographical location, more power facilities, plentiful labor and better transportation to rubber manufacturing centers. At the time the company established itself in Buffalo, however, the plant consisted of one building employing only 15 people.

The initial productive capacity of the company was 1½ tons daily. Today the company puts out over 5,000,000 pounds per month. The technical staff of the concern at the present time includes over 25 technically trained college graduates. The company maintains an extremely well-organized research laboratory. The company is well-known for its famous brands of "Buffalo," "Black Diamond," "Bison," "Elk," and "Tioga" reclaimed.

The founders of the company were Max Loewenthal, the only one now living and still chairman of the board of directors, R. A. Loewenthal and Theodore S. Bassett. The present officers besides Max Loewenthal include L. J. Plumb, president; A. F. Tallmer, assistant treasurer, and Jean Nesbit, sales manager.

Other Reclaiming Plants

There are a number of other rubber goods manufacturing plants which maintain reclaiming establishments, among them being chiefly the Firestone Tire & Rubber Company, which operates the Xylos Rubber Company, at Akron; the Miller Rubber Company, Akron, which has only been in the reclaiming industry for a short time and uses all its production in its own factory; the Crescent Insulated Wire and Cable Company, Trenton, N. J., manufacturing solely for their own use; the Manhattan Rubber Manufacturing Company, Passaic, N. J., which is also manufacturing solely for its own consumption, and the Dominion Rubber Company, Ltd., at Montreal, Canada.

Other plants engaged in reclaiming include the Acushet Process Company, New Bedford, Mass.; Askam Rubber Reclaiming Company, Milford, Conn.; Central Rubber Reclaiming Company, Findlay, Ohio; Defiance Rubber Company, Defiance, Ohio; Manufactured Rubber Company, Philadelphia, Pa.; Nearpara Rubber Company, Trenton, N. J.; Rubber Regenerating Company, Naugatuck, Conn., and Mishawaka, Ind.; Stockton Rubber Company, Stockton, N. J.; Vulcan Recovery Company, Trenton, N. J.; and Essex Rubber Company, Trenton.

Factory Layout of Gutta Percha and Rubber, Ltd.

Effect of Milling *on the* Plasticity of RECLAIMED RUBBER

By D. P. SWISHER AND P. W. SANDERS
U. S. Rubber Reclaiming Co., Inc.

A GREAT deal has been published in various periodicals as to the effect on the plasticity of the time of milling during the breaking down of crude rubber for factory operations. Little has been said concerning reclaimed rubber in the same connection, the usual assumption being that the plasticizing action of the reclaiming process to a large extent renders this breaking down of minor importance.

The following experiment was made in order to compare the plasticizing effect of milling on a standard tire reclaim both with crude rubber alone and with a mixture of equal weights of crude rubber and reclaimed rubber.

The mill employed was a heavy duty laboratory machine with 25.4 x 51 cm. (10" x 20") rolls having speeds of 12 and 18 RPM. The effect of milling was studied on three batches of equal volume, the weight of the reclaimed rubber batch being 4800 gms. and the others in proportion. The same conditions of gauge, temperature and working were maintained for all three batches as nearly as possible. The mill setting was such that the wall was about 9 mm. (⅜ in.) thick and the bank was about 5 cm. (2") in diameter, simulating in proportion the actual conditions of a large factory machine. Water was kept flowing in both rolls, the back being barely warm to the hand and the front slightly warmer in order to overcome the tendency of the reclaimed rubber batch to jump to the fast roll. After three preliminary passes with a tight setting, the mill was opened to a point about half-way toward the final setting and the batches worked rather rapidly for 5 minutes. The rolls were then opened to the chosen setting and the milling continued for 55 mniutes, cutting plasticity samples at the intervals given below. To insure even milling, two straight cuts were made from each side of the sheet every minute, the corners being folded back on the batch in each case.

The plasticity samples were cut from three points equidistant from each other and the edges of the sheet without interrupting the milling. They were allowed to cool about three hours and the plasticity determined with a Williams Plastometer, the test pieces being cut with a 19 mm. (¾ in.) punch and trimmed to a volume of 2 cc. (twice the sp.gr. in grams). The oven was held at 70 deg. C. (158 deg. F.), the test pieces were allowed to warm up 9 minutes and readings of their thickness were taken at intervals up to 6 minutes. From these readings the Plasticity (K) was calculated from the formula

$$K = \text{Thickness (Time)}n$$

It should be noted that n does not seem to be a constant, varying with each batch from .076 to .185.

The results obtained are given in tabular form in Table I and are represented graphically in Figure I.

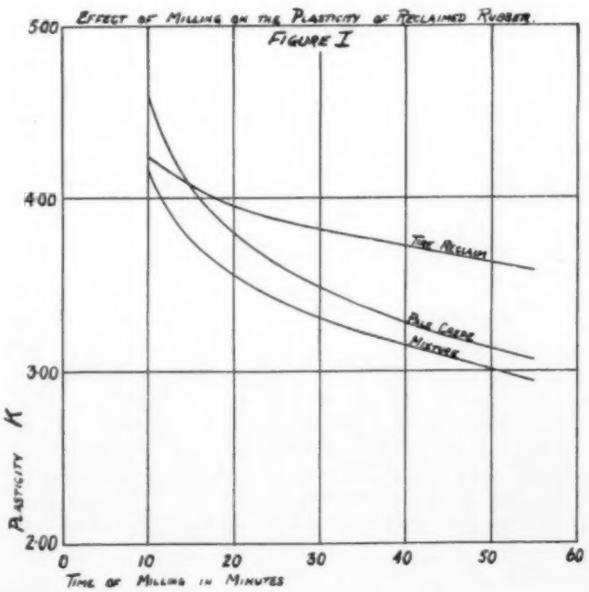


Table I

PLASTICITY K

Milling Time	100 *Tire Reclaim*	50 *Reclaim* 50 *Pale Crepe*	100 *Pale Crepe*
10 min.	4.25	4.18	4.60
25 min.	3.87	3.41	3.62
40 min.	3.72	3.15	3.26
55 min.	3.58	2.94	3.07

To determine whether the milling was causing deterioration of the physical properties of the batches containing reclaimed rubber, 800 grams of each was withdrawn when the 10 minute plasticity samples were cut and was compared with the final batch (55 minutes) by curing and testing in a straight sulphur mix. The results are given in Tables II and III.

Table II

PHYSICAL PROPERTIES

100 Tire Reclaim
5 Sulphur

Cure @ 40# (142 *deg. C.*)	*Milled* 10 *min.* Elong.	Tensile		*Milled* 55 *min.* Elong.	Tensile	
14 min.	444%	853#	(59.8)	441%	800#	(56.2)
18 min.	412	893	(62.7)	420	820	(57.6)
22 min.	388	913	(64.1)	413	837	(58.8)

Table III

PHYSICAL PROPERTIES

50 Reclaim
50 Pale Crepe
7.5 Sulphur

Cure @ 40# (142 *deg. C.*)	*Milled* 10 *min.* Elong.	Tensile		*Milled* 55 *min.* Elong.	Tensile	
22 min.	679%	1423#	(100)	717%	1342#	(95)
26 min.	721	1664	(117)	706	1425	(100)
30 min.	744	1782	(126)	717	1635	(115)

While it would appear that milling has much less effect on the plasticity of reclaimed rubber as compared with crude rubber, a mixture of the two seems even more responsive to milling treatment than straight crude rubber, thereby confirming previous observations

and statements that reclaimed rubber aids in the plasticizing of crude rubber. After reclaimed rubber forms a solid sheet in the mill roll (about 20 minutes in the case of this experiment) little further decrease in plasticity is obtained, the only effect of continued milling being a decided increase in stickiness. This action makes the use of reclaimed rubber particularly advantageous in frictions where skimming from the roll is to be avoided.

The physical properties of reclaimed rubber after continuous milling deteriorate but slightly if the tensile product is considered and in the case of the mixture of crude and reclaimed seem satisfactory.

Classification of Reclaimed Rubbers

By W. E. GLANCY

Research Dept., Hood Rubber Company

RECLAIMED rubbers may be generally classified as follows: Tires, Inner Tubes, Solid Tires, Boots and Shoes, Mechanical Goods. It will also be found that various reclaims have been made up by reclaimers, which reclaims were combined from the above materials to give reclaims with special properties. Those reclaiming plants which are connected with rubber manufacturing establishments will also have reclaims which are primarily intended for using up special scraps or overflows.

One other material which might be classified as a reclaim but which is radically different from the usual type of reclaim, is that of tire friction. This may be of variable composition, particularly as regards vulcanizing material.

Tires will be subdivided into extra refined or washed, regular refined and partially refined. A classification is also made in accordance with color such as black, dark gray and light gray. Formerly there was a white reclaimed tire classification. Inner tubes are also known by the color and by high tensile properties which they may have. There are several grades of solid tires, but only two are listed on the market today. These are "heavy" and "light." Mechanical goods reclaims will vary in accordance with scrap which is used, as well as color. Still another classification may be made and this is in accordance with the process employed to make reclaim. These divisions are acid, alkali and oil processes.

A general summary of the approximate properties of the various reclaims which are commonly recorded are as follows:

Tires	*Acetone Extract*	*Chloroform Extract*	*Ash*	*Sp. Gr.*	*Tensile*
Whole Tire—Black	6–7%	17–18%	20–22%	1.18–1.20	600#/sq. in.
Whole Tire—Gray	6–7	16–17	35	1.30	500 sq. in.
Whole Tire—White	5–6	16	39	1.40	550 sq. in.
Inner Tubes					
Gray	6–9	17	7–8	1.02	200 sq. in.
Red	6–7	22–23	27	1.22	700 sq. in.
High Tensile	10	20	24	1.16	1200–1500
Boots and Shoes, Usual	7–8	12	51	1.60	800
Solings	10	16	48–50	1.60	500
Solid Tires, Heavy	9	8	46–50	1.7	700
				1.6 or under	
Tire Frictions	8	variable	13–18	1.00–1.10	2000

Tire reclaims are made practically without exception by the alkali process. Inner tubes are usually made by treatment with various kinds of oils, and boots and shoes are treated by the acid process.

Complete Recovery of Scrap Rubber

By E. ROUXVILLE

Abstract from Revue Générale du Caoutchouc, Vol. 6, No. 48, pp. 15-16 (1929)

ON the assumption that vulcanized rubber is not plastic because the viscous phase of raw rubber has been modified by sulfur, it should be possible to reclaim vulcanized rubber by restoring to it a viscous phase and a result its plasticity. Terebenthene may be polymerized by catalysts with the formation of a viscous terpene of the composition $(C_{10}H_{16})n$, the physical and chemical properties of which are similar to those of the viscous phase of raw rubber. It dissolves raw and vulcanized rubber, it vulcanizes in a mixture with raw rubber and it does not influence the quality. Scrap rubber is finely ground, is mixed with 5 to 10 per cent of the polymerized terpene, the ordinary proportion of sulfur is added, and the mixture is vulcanized in the ordinary way. The polymerized terpene has an antioxidant effect. Because of its consistency, it is better than rubber for impregnating cotton, jute, cork, etc. Various other applications are suggested.

Collection of and Trade in Scrap Rubber

(*Continued from Page* 551)

The trader is constantly placed in the awkward position of being obliged to affect an amicable settlement with both parties without losing the good-will of either. This is usually an expensive procedure. Most of the difficulties of this nature occur during the winter months. The junk dealers as a rule, store their rubber stocks in the open without taking the precautions necessary to prevent the material from becoming full of ice and water. Shipments are occasionally so frozen that they must be pried apart to be unloaded. The mill then finds it necessary to make deductions for extra handling as well as for the moisture contained. The moisture content of water-soaked tires is generally determined by taking ten tires representative of the whole shipment which are weighed in their wet condition, dried thoroughly and re-weighed. The percentage of moisture thus determined enables the mill to arrive at the net weight of the entire shipment. This procedure takes up considerable time and delays the final report and payment to the shipper, thereby causing additional trouble and inconvenience.

History and Trends in Reclaimed Rubber

(*Continued from Page* 547)

and agitated, using several additions of fresh water. In 1904, one manufacturer installed a large wash tank and individual washers were abandoned. The stock in the washer was given as many as eight washings to remove the excess caustic. The wash water was passed through rotary screens to catch any rubber that had escaped during washing. Flat or inclined screens were also used for this purpose. In most cases the rotary screens were abandoned in favor of the latter. Practically all of the washing today is done on stationary, vibrating or rotary spray screen washers. The latter is now available in a triple compartment type of machine.

Pressing

In 1899 the washed stock was treated on steam heated plates. The stock on the plates was kept in motion by an agitator. After sufficient moisture had been removed the stock was placed on dry screens. When this method was used on acidized scrap, oils were mixed with the scrap on the dry-plates after which it was devulcanized in a heater.

In 1904 screw presses were in use to remove the excess water. In 1915, 40-inch centrifugal machines were used by some manufacturers. Since that time various types of centrifugal, screw press, and squeezer machines have been adopted by the industry.

Drying

Flat screens were used from the beginning to dry the devulcanized stock. An improvement over stationery flat screens consisted in drawing devulcanized stock over steam heated plates by means of a chain drive with cross members cut out in such a manner as to turn the stock over and at the same time to keep it in a forward motion. Flat screens were replaced by pitched screens about 1911. The pitched screen consisted of two flat screens reclining at a 45 degree angle. Direct fired rotary dryers were tried out prior to 1912. Pitched screens are still in use in some factories but in some cases they have been replaced by rotary or pan vacuum dryers, rotary oil fired dryers, or single or multiple conveyor dryers. The new dryers occupy but little floor space and handle a large volume of material so that drying costs have been greatly decreased. Single conveyor dryers were installed in 1919-1920.

Refiners

Manufacturers of acid reclaims, when using finely ground scrap and mill washing, found it unnecessary to use refiners as late as 1907. Numerous sizes of refiner rolls have been tried or are being used today. Some of the early refiners used 16″ and 18″ by 32″ rolls. The 16″ rolls were subsequently replaced by 20″ rolls. Manufacturers at present are using the following combinations of roll sizes: 19″ and 24″ by 30″, 21″ and 24″ by 32″, 22″ and 24″ by 36″. A refiner having 23″ and 26″ by 45″ rolls was tried out in 1917 but was found to be unsatisfactory.

Strainers

One manufacturer installed a strainer in 1903, a second in 1904, and a third installed six-inch strainers in 1905. Up to this time very little if any reclaimed rubber was strained. The 6″ machine was equipped with a bee-hive head which was a $^{3}/_{16}$″ forging, having its entire surface perforated with finely drille dholes. The reclaim was forced through the holes in the head, holding back the metal and other foreign matter. In 1907 to 1908, straining through a wire screen was begun. The wire was backed up by a plate containing one-half inch perforations. Straining through wire screens was not generally used until 1913 or 1914. Eight-inch strainers were used in 1908 and these were followed with ten-inch strainers in 1917.

Leaf Sheeting

Reclaimed rubber was usually cut off in slabs from the batch or finishing mill. In most cases it was allowed to roll up from the refiner to form a round roll, or "sausage." In other cases the refiner sheet was gathered together and rolled up in balls, known as "cabbage heads." In 1916, the stock coming from the refiner was first wound on drums. After allowing it to build up to desired thickness, it was cut off to give what is known as leaf sheeted form.

Acknowledgment

The writer desires to express his appreciation to the following for assistance rendered during the preparation of this article: J. McLean, Pequanoc Rubber Company; F. H. Brewster, U. S. Reclaiming Company; H. P. Fuller, E. H. Clapp Rubber Company; D. Borland and T. McKane, Philadelphia, Pa.; William Metzler, Goodyear Tire & Rubber Co.; F. H. Mason, F. Meier, E. Wilhelm, B. F. Goodrich Company; H. G. Day, A. S. Ferrer, E. G. Croakman, and E. B. Busenburg, Philadelphia Rubber Works Company.

Exports of Scrap and Reclaimed Rubber from the United States for the First Six Months of 1929

	Reclaimed Rubber		Scrap Rubber	
	Pounds	*Dollars*	*Pounds*	*Dollars*
Austria	2,400	$207	.....	.....
Belgium	226	15	433,703	$28,110
Denmark	2,216	134	.....	.....
Finland	.....	.....	4,541	318
France	109,563	6,675	7,912,432	399,725
Germany	160,601	14,772	2,877,153	145,219
Irish Free State	2,013	106	.....	.....
Italy	11,135	1,138	195,535	11,177
Netherlands	.....	.....	307,512	17,993
Norway	4,577	595	4,880	766
Poland and Danzig	.....	.....	297,177	18,468
Portugal	.....	.....	337,677	26,584
Spain	13,048	753	5,389,612	303,967
Sweden	19,884	1,933	.....	.....
United Kingdom	2,094,145	146,535	2,392,017	131,451
Canada	12,060,414	831,804	2,716,584	95,201
Mexico	22,844	2,524	43,358	755
Newfoundland	100	10	.....	.....
British West Indies	.....	.....	20,615	1,443
Cuba	12,639	896	.....	.....
Argentine	34,427	3,333	60,961	2,382
Brazil	11,059	995	.....	.....
Venezuela	15,042	1,632	.....	.....
British India	.....	.....	1,806	95
China	.....	.....	367,545	5,013
Hong Kong	.....	.....	527,077	5,370
Japan	97,237	6,132	2,315,943	59,266
Kwantung	.....	.....	54,000	849
Philippine Islands	.....	.....	18,571	650
Australia	1,049,092	78,512	.....	.....
Union of South Africa	119,076	11,723	.....	.....
Egypt	.....	.....	7,547	897
Hawaii	.....	.....	810	140
Porto Rico	.....	.....	1,950	83
TOTAL	15,840,738	$1,110,424	26,249,006	$1,255,922

A new foreign publication called *Dechets et Regeneres*, devoted to the reclaimed and scrap rubber trade has made its appearance in Paris. The editorial offices are 16 Rue des Saussaies.

World Trade *in* Reclaimed *and* Scrap Rubber

(*Continued from Page* 550)

production is consumed locally. The trade during 1928 was very dull because of the low price of the crude product. Reclaimed rubber is used in the manufacture of second-grade rubber heels, bicycle tires, and other low-priced rubber products such as flooring.

The two largest rubber manufacturing establishments in the Netherlands have their own regenerating plants. Besides these two concerns, there is a small factory, the N. V. Industris of Schiedam, which produces reclaimed rubber, but it is of minor importance. The total production for all three plants for 1928 is estimated to be not more than 400,000 pounds.

Trade in Other Countries

The larger British reclaimers of rubber scrap are located in the north of England, particularly around Manchester, where they consume not only the large surplus of old rubber articles discarded in the Kingdom, but import large quantities from the United States and the Continent. The latest available figures indicate that the United States supplies about 60 per cent of the British imports of waste and reclaimed rubber, and of the total British imports about 40 per cent is shipped to Manchester.

Reclaiming has reached a considerable extent in Japan where imports of scrap rubber amounted to 3,970,425 pounds in 1928, the United States supplying about 91 per cent of the total imports. The great bulk of the scrap rubber imported is reclaimed, mixed with a certain percentage of new rubber, and used in making rubber soles for "tabi," a short cloth sock almost universally worn by laborers in Japan, and a very cheap rubber shoe which is exported to China.

The leading manufacturers of Australia import reclaimed rubber in fair quantities. It is used principally in the manufacture of mechanical rubber goods of all kinds, including beltings, garden hose, and also rubber heels. It is understood that it is not used to any great extent in the manufacture of tires. The three principal rubber producers operate plants for reclaiming unvulcanized motor friction and use the acid process exclusively.

Italy is a fairly good market for scrap rubber, although the demand at present is not as great as it was in 1926 and 1927, on account of the reduction in the price of the crude product. It is estimated that Pirelli consumes approximately 3,000 tons of scrap rubber yearly. The United States is conceded to be the principal source of supply for old tubes, while Great Britain leads as a source for old tires.

Reminiscences *of an* Old Timer on Reclaimed Rubber

(*Continued from Page* 553)

worked on a mill over which a stream of water was constantly running. It took thirty-five passes through this mill before the rubber would stick together in a crepe-like sheet. These crepe sheets were hung up to dry for three weeks in drying chambers. Every day a man would go around with a shovel and broom and scrape up all the metal which fell out of the sheets as they dried. At the end of three weeks the sheets were laid out on tables and men picked out with a sharp knife all small pieces of metal, cloth, etc., visible to the eye. I do not suppose in a week's time a crew of five or six men oculd clean as much of this rubber as we now do in an hour with a ten inch strainer.

Shoes were the main raw material for reclaimed. Russia offered one of the best fields in the collection of such scrap. About 1910 or 1911, however, the Russian government imposed an export duty on scrap, but allowed reclaimed to leave the country without duty. There was no tariff wall here against reclaimed and so feeling that American reclaimers might be at the mercy of the Russians we rented a small unit at Odessa and installed the simplest kind of machinery for the purpose of semi-preparing boots and shoes to the point that they could be exported from Russia without duty. When we finally ironed out all the difficulties entailed with the bribery of Russian bureaucracy we were able to ship substantial quantities to this country. Russian shoes then yielded an excellent reclaimed, and I recall selling to an English manufacturer prior to the War many hundreds of tons of shoe stock in which a substantial proportion of these Russian shoes was incorporated. Think of it—we had purchased shoes in Moscow or St. Petersburg, now Leningrad, shipped them to Odessa, semi-processed them, brought them to this country, finished the process in Buffalo and had reshipped to England at a lower cost to the manufacturer than he could buy from his local source of supply, and still make a profit. The war, of course, brought a stop to this ingenious resource and our property disappeared very quickly. At last reports, some of the machinery was grinding flour for the Soviet Government.

Reclaim's Old "Inferiority Complex"

One of the greatest difficulties reclaimed rubber has had to face throughout its history has been the impression that articles made from it must of necessity be of inferior quality. When our country went into the War and restrictions were imposed upon the manufacture of rubber goods for other than war purposes, the use of reclaimed fell off very substantially. I remember many arguments we had with War Committees urging the necessity of conservation by employment of large percentages of reclaimed, but our best arguments were of small avail. It is hard to realize that only ten years ago the average manufacturer of rubber goods felt compelled to restrict to a minimum the use of reclaimed rubber. I wonder what the price for crude rubber would be today even in spite of the production of some 800,000 tons of plantation were this policy pursued now.

Steady Improvement in Quality

The Stevenson Act, put into effect in October, 1922, probably in the long run materially stimulated interest in reclaimed and brought about the erection of the large plants now operating in this country for its manufacture. Despite the bias to be expected from one who has been so many years in the business, I think I am correct in saying that reclaimed today is looked upon as an essential ingredient in the vast majority of rubber goods. We have come a long way in the last ten years in our knowledge of manufacturing rubber articles and in step with this progress the reclaimer has correspondingly improved his product. Mr. Hoover's campaign in the conservation of rubber created fresh interest and although it had the temporary effect of having our industry over-planted, in the end I think his activities will prove to have been beneficial. I consider that we still are far from the goal of an ideal reclaimed rubber. So far as I know, no one has yet properly destroyed the bond uniting the rubber hydrocarbon with sulphur molecule, created during vulcanization. Some day I believe this will be accomplished, and when it is we will see a reclaimed rubber having all the properties of the original mixture of crude and compound ingredients before it was vulcanized. The vast accumulations of scrap in the world will always serve to act as a stabilizer and the intelligent and proper use of reclaimed in some form will be continued independent of the price of crude rubber.

EDITORIAL COMMENT

Reclaimed Rubber Comes of Age

ASIDE from the political factors which have entered into the rubber producing industry such as the Stevenson Restriction Act, two reasons for the important position now assumed by reclaimed rubber stand out prominently in any survey of the rubber goods manufacturing industry. First, reclaimed rubber, through research developments, has attained a quality which is near akin to crude rubber and secondly, compounding practice has become so specialized and formulae so established that where reclaimed has been found adequate there has been no attempt to revert to crude rubber even when there has been a radical reduction in crude rubber prices.

Reclaimed rubber has thus ceased to carry any stigma of inferiority and now has an established place in the manufacturing industry. That this condition of affairs is a tribute to the ingenuity and thoroughness of the scientific staffs of the reclaiming trade is saying only too little. The problems which faced the early reclaimers in attempting to place their product successfully on the market in such quality as would meet satisfactory tests and give adequate performance, were as real and overwhelming as any that have confronted the chemical fraternity in the rubber industry. That today the quality of reclaimed rubber vies with some qualities of crude and is infinitely better than many of the off grades and wild rubbers speaks volumes for the tenacity and resourcefulness back of the reclaimed trade.

Reclaimed rubber has justified its place in the rubber goods manufacturing industry and has fully come into its own.

The 1929 Census of Manufactures

THROUGH the appointment of an advisory committee on manufactures by Secretary Lamont, under the Chairmanship of Colonel L. S. Horner, president, Niles-Bement-Pond Company, business and industry will doubtless obtain the kind of data through the 1929 Census which will be of most practical value in the study of markets and in planning for the future. The Census Bureau has a tremendous task before it next year. Counts on population, manufactures, agriculture, mining and distribution must be taken.

The advisory committee on manufacturing will determine upon questions to be asked in the forthcoming census of manufactures, limiting the questions to those of practical value to manufacturers. It will, also, determine tabulations which ought to be made subsequently, and these will be approached entirely from their potential value to the manufacturer. But the value will depend largely upon the cooperation of manufacturers in sending reports promptly to the Census Bureau.

At their first meeting in Washington on July 25, the committee decided to recommend a complete census, one covering all manufacturing plants regardless of size. The smaller plants will be covered by the population enumerators, while the larger plants will be approached by the Division of Manufactures of the Census Bureau direct. The committee also approved the policy of the Census Bureau in conferring with industrial organizations and with representative members of each industry in formulating schedules especially adapted to the industry in question.

To accomplish this purpose the committee desires the widest possible expression of opinion on the part of manufacturers themselves as to the questions to be formulated, the practicability of supplying the information desired, and the scope of the census. Its aim is to suggest the character of information which will be helpful to industry in meeting larger problems of production and distribution with which it is confronted in shaping production and sales policies. The committee solicits advice and suggestions from individual manufacturers, business organizations, and trade associations, to the end that the recommendations made will represent the consensus of business itself.

The time for doing this is short, as it will be necessary to begin the printing of the schedules well in advance of the enumeration. For this reason the committee is asking that suggestions be sent to it at once.

Therefore, for the first time industry itself has been called into consultation to shape the stupendous task of taking the census of manufactures. Upon industry itself will rest very largely the responsibility for the outcome.

The rubber industry will be asked along with the other industries to make this census survey as complete as possible and should respond whole-heartedly in the project. A vast amount of good to the industry should result from a full and accurate compilation of census data.

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FORMER REPUBLIC HEAD JOINS B. F. GOODRICH CO.

J. H. Connors, who recently resigned as president of the Republic Rubber Company, Youngstown, O., has been appointed as general manager of the mechanical division of the B. F. Goodrich Company in charge of manufacturing and sales. President James D. Tew of Goodrich also announced that additional duties have been assigned to T. G. Graham, vice-president, and to T. B. Farrington, in charge of the factory service division.

Mr. Graham will take over complete management of the manufacturing and sales of the tire division of Goodrich. He will continue in charge of the health and production control departments. Mr. Farrington, who now heads factory service and employment divisions, will take charge of processing and machine development, in addition to the other two jobs.

President Tew will retain control over the research laboratory and original equipment divisions, as J. W. Schade, head of the laboratory, and H. C. Miller, in charge of original equipment, have been instructed to report direct to the president.

Wildman Equipment Sold

All machinery and equipment of the Wildman Tire & Rubber Company, Port Clinton, O., was sold at public auction on August 15, with the Industrial Plants Corporation, 25 Church Street, New York City, acting as auctioneers. There were 150 buyers present to bid for the equipment, which included mixing mills, calenders, tire and tube vulcanizers, presses, tubing machines, and various other items of small and large machinery. The land, comprising 17 acres on the main line of the New York Central, and the six buildings were not sold.

Former Williams Plant Sold

The Tandem Wheel Company, Warren, O., will move two-thirds of its operations to Akron and will be located in the plant formerly occupied by the Williams Foundry & Machine Company, at 62 Cherry Street in that city. The plant will be used for assembling and servicing tandem wheels for Ford trucks and for distribution through northern Ohio.

LEE SCHOENHAIR, pilot of the B. F. Goodrich Company, will fly the Goodrich Silvertown monoplane in the national air derby from Los Angeles to Cleveland, in connection with the national air races at the latter city between August 25 and September 2. Two months ago he flew from Los Angeles to Cleveland in 13 hours and 29 minutes in an unsuccessful attempt to break the cross-country record time.

15-Mile Increase in Car Speed Doubles Tire Wear

That the rate of tread-wear is doubled with an increase of but 15 miles an hour in automobile speed, has been proved, according to experts of the Miller Rubber Company, Akron, O. It was found after exhaustive tests by Miller test fleets that cars traveling at 35 miles and then increased to 50 miles per hour would show double the rate of tread wear at 50 miles that was shown at 35 miles.

Under the strain of such fast driving, the Miller tire men also found that the carcass of a tire will become softer and that there will be more give and play to the cords of the carcass, weakening the entire casing.

FIRESTONE GOLF COURSE IS OPENED FOR WORKERS

What is termed the world's finest and largest industrial golf course was formally opened for play by the Firestone Tire & Rubber Company at Akron on August 10. Besides Firestone executives, the mayor, city council and officials, together with the professionals from the Akron district, took part in the opening ceremonies.

Firestone Golf Course No. 1, as it is known, compares favorably with the country's most pretentious links. Last summer, play was started on the first nine holes of Course No. 2, which became so popular that crowded conditions made it necessary to rush work on the new course, making 27 holes now available for play.

Thomas with Hammil & Gillespie

Announcement has been made that, effective August 15, V. G. Thomas, who formerly headed V. G. Thomas & Company, New York City, has become associated with Hammil & Gillespie, Inc., 225 Broadway, New York City. The affairs of V. G. Thomas & Company are now being cleared up, and Mr. Thomas will hereafter devote all his time to his new connection. Hammil & Gillespie, Inc., are well known in the rubber industry as direct producers and agents for a line of compounding materials, including barium carbonate, magnesium carbonate, barytes, clay, talc, whiting, zinc stearate and mica.

MARATHON TIRE FACTORY IS CLOSED BY GOODYEAR

Transfer of the activities of the Marathon Tire & Rubber Company, subsidiary of the Goodyear Tire & Rubber Company, at Cuyahoga Falls, O., to the plants of the parent company at Akron was announced August 12 by P. W. Litchfield, president of Goodyear. In announcing the transfer, Mr. Litchfield declared that a large part of the Marathon products has been made in the Akron plants of the Goodyear company for some time.

"Because of savings possible through mass production in a larger plant, it has been decided to bring all the Marathon production to Akron," he stated. "This move in no way affects the present sales policies of the Marathon company, but it is expected to give the company a fuller and more complete line of tires, including a new super tire to be announced soon."

No mention was made as to the disposition of the Marathon factory at Cuyahoga Falls. It was indicated that these plans have not been formulated as yet.

N. T. D. A. Show Plans Progress

Details of the National Tire Dealers' Association annual convention, to be held at the Sherman Hotel, Chicago, Ill., from November 11 to 14, are making steady progress. Among the exhibitors who have thus far contracted for space at the exhibition are the Firestone Steel Products Company, the Polson Rubber Company, the Dill Manufacturing Company, the Williams Foundry & Machine Company, the Monarch Rubber Company, the Brown Tube Company, the Vogue Rubber Company, the Martin Rubber Company, the Ford Motor Company and the Western Rubber Mold Company.

Kleinert Pays Dividend

The I. B. Kleinert Rubber Company has declared a dividend of 62½ cents a share on its common stock, payable September 3 to stock of record August 15. This is the first dividend declared on the company's common since 1924.

Smith & Smith Move

Smith & Smith, compilers of a rubber technology reference service, have announced their removal to 455 Chestnut Boulevard, Cuyahoga Falls, O. They were formerly located at 138 Bachtel Avenue, Akron, O.

Seiberling Resumes Broadcasts

The Seiberling Singers of the Seiberling Rubber Company have inaugurated a series of special summer programs as a part of the company's radio broadcasting activities. Prominent guest artists are being featured.

U. S. RUBBER CHEMISTS ARE INVITED TO GERMANY

The executive committee of the German Society of Rubber Chemists and Engineers has extended an invitation to the members of the Rubber Division of the American Chemical Society to attend its next meeting, which will be held in Frankfurt a/M on June 8 and 9, 1930, in connection with the annual meeting of the Verein Deutscher Chemiker. By vote of the executive committee of the Rubber Division, this invitation has been accepted.

E. A. Hauser has asked particularly that several papers come from the Rubber Division, and he hopes to have the titles sufficiently far in advance to enable him to secure speakers on the same subjects from his members.

TIRE PRICES TO GO UP, SAYS WILLIAM O'NEIL

William O'Neil, president of the General Tire & Rubber Company, believes that prices of tires will be revised upward within a year. In a recent statement, he declared, "Tire prices are the lowest they have ever been. They are based on low contracts for cheap cotton and on the low average cost of rubber. Consumption of crude rubber is catching up to capacity crude rubber production, and certainly within a year tire prices will be higher because of crude rubber prices."

New Colorado Tire Company

The rubber factory of the defunct Dry Climate Tire Company on the outskirts of Arvada, Col., is to be reopened by the Hercules Rubber Company. The latter has been organized by Dr. J. H. Dalbey, and the company is to turn out truck, airplane and bus tires and other rubber articles.

Endurance Record Airplane Used Goodrich Accessories

The Curtiss-Robin plane that Jackson and O'Brine flew above St. Louis for more than 400 hours to set a world's endurance record was equipped with Goodrich Silvertown tires, Goodrich shock absorber discs, and rubber engine pads. The refueling hose with which their daily supply of gasoline was taken in was one and a half inch rubber hose made by the B. F. Goodrich Company.

When advertisements began to appear in the newspapers telling what kind of gasoline, what type engine and what brand of cigarettes the flyers were using, Will Rogers, actor-humorist, made the remark that they had neglected to announce the name of their refueling hose. The B. F. Goodrich Company promptly wired Mr. Rogers the answer and has received considerable newspaper publicity since the incident.

Patrick Gow

Patrick Gow, chairman of the rubber and produce brokerage firm of Gow, Wilson & Stanton, London, England, and founder of the Gow lectures on the colloid chemistry of rubber at the University of London, died late last month. Succeeding his father as chairman of Gow, Wilson & Stanton, Ltd., he took an active part in the development of the plantation rubber industry almost from its inception, and he was associated with several successful plantation companies. Some of the most important developments in the handling of liquid latex also owe their beginnings to Mr. Gow, including the concentration of latex by means of the "Revertex" process.

Goodyear's Huge Dirigible Hangar Progressing

WHAT will be the world's largest structure of its kind, the giant hangar being erected by the Goodyear-Zeppelin Corporation at Akron to house the two dirigibles it is building for the United States Navy, is gradually taking definite shape. When completed, it will be 1,000 feet long, 325 feet wide and 200 feet high. Four electrically operated doors, each an eighth part of a sphere, will be constructed over the mouth of the hangar when it is completely finished.

SAFETY CONGRESS OPENS AT CHICAGO ON SEPT. 30

The largest group of persons who have ever assembled in the United States in the interest of accident prevention and life conservation will meet in Chicago from September 30 to October 4 at the sessions of the 18th annual Safety Congress. At least 7,000 persons are expected to atend this national conference, including 354 selected speakers for the 41 separate program divisions and the 125 sessions of the Congress.

The headquarters will be the Stevens Hotel, but the extensive program will make necessary the use of the Congress Hotel and the Eighth Street Theatre as well for some of the sessions. The Rubber Section is now preparing its program and will shortly announce its list of talks and activities. The newly formed Aviation Division will have special sessions.

SERVICE MANAGERS GROUP APPROVES NEW BOOKLET

A meeting of the service managers' committee of the Tire Manufacturers Division, Rubber Manufacturers' Association, was held at the Akron City Club, Akron, O., on August 2. The text of the association's new educational booklet on the care of tires for passenger cars was finally approved. The booklet, the title of which is "Tire Tips," is expected to be ready for distribution in a few days.

Following the meeting, all those present were the guests of the Goodyear Tire & Rubber Company on flights above the city and surrounding country in the company's dirigible *Puritan*.

New Lows for 17 Rubber Stocks

With but three or four exceptions, all stock issues of leading rubber manufacturing companies declined on the various stock exchanges of the country during the past fortnight. Firestone and Miller showed very slight gains, and Hood common doubled in price on news of a merger with Goodrich on a two-for-one exchange basis of shares. Seventeen rubber company stocks sank to new lows for 1929 or longer, including Goodyear common, U. S. preferred, Fisk common and preferred, and Goodrich common. Prices of shares of leading rubber companies on August 17 compare as follows:

	Last Price		High	Low
	Aug. 17	Aug. 5	—1929—	
Ajax	4⅛	4¾	11¼	4
Falls	4	—	11⅝	4
Faultless	31	—	39⅞	31
Firestone	242	240	309	220⅛
do. 6% pfd.	109½	—	111	108
Fisk	7	7⅞	20⅛	6¾
do. 1st pfd.	36⅛	40	72½	35⅝
General	255	255	298	236
do. pfd.	93	95	102	93
Goodrich	74¾	75⅝	105⅝	72⅛
do. pfd.	111½	—	115⅛	111
Goodyear Com.	106⅝	118¾	154½	103
do. pr. pfd.	101⅝	101⅝	104⅞	101
Hood	35	—	35	18
India	40	40⅛	73	39
Intercontinental	8¾	—	14¼	8⅛
Kelly Springfield	10¼	12½	24	9⅞
do. 1st pfd.	60	—	100	58⅝
Lee	12½	13⅛	25	10
Miller	14½	14¼	28¾	11⅝
do. pfd.	50	50	83	49
Mohawk	38	39	66	38
do. pfd.	78	—	90½	78
Norwalk	2	2⅛	6⅛	1¾
Pirelli	64	—	68	50½
Seiberling	31	33	65	30½
do. pfd.	104	—	107⅞	104
U. S. Rubber	45⅝	47¼	65	42
do. pfd.	70½	73¾	92½	69½

Names in the News

HARVEY S. FIRESTONE, president of the Firestone Tire & Rubber Company, has presented the Brookside Zoo, Cleveland, O., with an ostrich and a leopard given to him by PRESIDENT KING of Liberia.

P. W. LITCHFIELD, president of the Goodyear Tire & Rubber Company, went to Lakehurst, N. J., during the early part of the month to inspect the *Graf Zeppelin* and to visit its commander, DR. HUGO ECKENER. He traveled to Lakehurst from Camden, N. J., in the Goodyear airship, *Vigilant*.

T. G. GRAHAM, first vice-president of the B. F. Goodrich Company, has been in Atlanta, Ga., this month to complete arrangements for starting erection of the new tire factory there, on which work is expected to start early in September. He was accompanied by H. E. COOKE, director of engineering, and THAYER FARRINGTON, production manager.

G. J. JOINT has been appointed as advertising manager of the Goodyear Tyre & Rubber Company, Ltd., Wolverhampton, England. He has been with the company for ten years and has held the posts of office manager at Bristol, assistant secretary to the company, and sales representative in the East Midlands territory.

J. W. DUNNING, for ten years at the Perth Amboy plant of the Roessler & Hasslacher Chemical Company, has recently been transferred to the Niagara Falls plant of the same company.

M. L. KOCHHEISER of the auto tire sales department of the Goodyear Tire & Rubber Company, was recently awarded a check for $500 by the suggestion committee of the company. His award is the largest paid by Goodyear to any individual for a suggestion this year and is the first made to a member of the sales organization.

STALEY C. MOULTON has accepted a position as chemist with the Rubber Service Laboratories Company at Nitro, W. Va. He was formerly assistant chemist of the District of Columbia Health Department.

DELPHOS W. BAKER, formerly of the cost accounting departments of the Goodyear Tire & Rubber Company and the Firestone Tire & Rubber Company, is a candidate for the office of municipal judge in Akron.

FRANK K. ESPENHAIN, executive vice-president of the Fisk Rubber Company, Chicopee Falls, Mass., has returned to his office after a short business trip to San Francisco. Mr. Espenhain made the trip from Columbus, O., to California by airplane.

H. F. SCHOEFIELD, A.M.C.T., has been appointed by the Rubber Regenerating Company, Ltd., as their technical representative on the accelerators and anti-oxidants of the Naugatuck Chemical Company.

GOODYEAR APPOINTS BELL AS PILOT OF NEW PLANE

W. C. Young, manager of aeronautic sales for the Goodyear Tire & Rubber Company, has announced the appointment of C. C. Bell, Cleveland-Pittsburgh air mail pilot, to operate the company's new Fokker plane. The new ship is to be used in connection with the development of Goodyear airplane tires and other accessories, including the newly introduced Musselman air wheel.

Mr. Bell, whose home is in Mansfield, O., was formerly a pilot on the night mail route between Cleveland and Pittsburgh, which

C. C. BELL

route is considered particularly severe due to weather and to rain and the fact that it is operated without lights. He is a member of the Air Pilots Association, Class A, and holds a transport license.

Receiving his early training in flying at Curtiss Field, N. Y., in 1923 and 1924, he barnstormed for three years in Ohio, West Virginia and Pennsylvania, gaining between 1,800 and 1,900 hours to his credit. He operated the Alliance Aero Taxi in 1927 and part of 1928, later joining the Ohio Air Transport Company at Lansdowne Field, Youngstown, O.

JAMES W. MACKAY, until recently in the footwear control laboratories of the United States Rubber Company at New Haven, Conn., has just joined the General Atlas Chemical Company, makers of Gastex. He is located in the company's laboratories at Linden, N. J., and will do general compounding and investigations on the use of Gastex in rubber compounds.

LIEUTENANT COMMANDER ZENO W. WICKS of the United States Navy has accepted a position with the Goodyear-Zeppelin Corporation as hangar and construction superintendent. As one of his last duties as a naval officer, he had charge of the refueling of the *Graf Zeppelin* at Lakehurst, N. J., before its start on a world tour.

CARLE C. CONWAY, president of the Continental Can Company, was elected a director of the United States Rubber Company at the regular monthly meeting of the board of directors on August 6. He succeeds HENRY F. MILLER, who resigned recently.

B. E. LORENTZ has assumed his new duties as factory manager of the Cooper Corporation tire division at Findlay, O. He was formerly in charge of the tire division of the Gutta-Percha Rubber Company, Ltd., Toronto, Ont.

FRANK S. ALLISON has been appointed general sales manager of the Corduroy Tire Company, Grand Rapids, Mich. He was formerly president of the Allison Rubber Company, Kansas City, Mo., wholesale and retail tire distributors.

CY CALDWELL, until recently pilot of the Silvertown plane of the B. F. Goodrich Company, was rescued on August 13 after a Cleveland-Detroit amphibian plane he was flying had nose-dived into Lake Erie. His co-pilot was reported as missing.

V. R. JACOBS, assistant manager of the aeronautic department of the Goodyear Tire & Rubber Company, was a speaker at the meeting of the Cleveland Club on August 13 at Wade Park Manor. He spoke on the general subject of rigid aircraft.

JOSEPH A. ANDREOLI, export manager of India Tire & Rubber Company, and Mrs. Andreoli have returned to Akron after a three-month tour of Europe.

WILLIAM C. BLAKE has been named manager of truck and bus tire sales for the United States Rubber Company. Until recently he held a similar position with the Kelly-Springfield Tire Company. H. A. FARR has been appointed as assistant to L. M. SIMPSON, general sales manager of the tire department. He has been with the company 20 years, serving recently as tire sales manager in the Pacific division, in which position he is succeeded by J. B. MAGEE, former Los Angeles branch manager. J. CHESTER RAY, manager of the Pittsburgh branch, who has been with U. S. for 20 years, has been promoted to assistant manager of district tire sales.

CATALPO
for
Treads

Rubber News Around the World

SEIBERLING TO PLAN NEW RUSSIAN RUBBER FACTORY

The Amtorg Trading Corporation announced on August 15 the consummation of a contract between the Soviet Rubber Trust and the Seiberling Rubber Company, Akron, O., in accordance with which the American firm will prepare the designs and all plans and specifications for the construction of a new tire factory in the Soviet Union. M. Nikoforov, chairman of the Rubber Trust, is at present in this country.

The tire factory, to be constructed probably at Yaroslavl, is to have an output of 3,100 automobile tires, 9,000 bicycle tires and 480 motorcycle tires per seven-hour shift. Several foremen and workers of the Soviet Rubber Trust will work for a time in the plants of the Seiberling company. Two Soviet engineers will participate in the designing of the tire factory.

In commenting upon this new technical assistance contract, Saul C. Bron, chairman of the board of directors of the Amtorg Trading Corporation, called attention to the fact that the three automobile (passenger car and trucks) factories at present being constructed or expanded in the Soviet Union are also being built according to American designs.

The total number of technical assistance contracts between Soviet industrial organizations and American firms has reached twenty-five. More than half of these were concluded since the beginning of the current year.

HIGHER BRITISH EXPORTS OF AUTOMOBILE TIRES

Exports of automobile casings from the United Kingdom to foreign countries during the first six months of 1929 numbered 550,598, a sharp increase compared with the figures for the same period of 1928 which showed 360,842 casings exported. The value of these exports for the first half of 1929 was £1,285,948, and Argentina, New Zealand and Italy were the leading markets in the order named.

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American Tires First in Egypt

American tires have gained first place in the Egyptian market on account of the increased importation of American automobiles and the renewal of original tire equipment, according to a report of the Rubber Division of the United States Department of Commerce. Automobile dealers handling American cars maintain small stocks of American tires for replacement, and, according to the report, tire manufacturers not having a working agreement with the car dealers can not gain any foothold in the Egyptian market.

Golf Ball Imports Higher

Imports of golf balls into the United States during the first six months of 1929 totaled 1,584,517 as compared to 1,420,423 in the lrst half of 1928. During June imports of golf balls numbered 359,480, as against 346,100 in May and 100,160 in June, 1928. June imports were valued at $111,027, a unit value of 30.9 cents per ball as compared with 28.5 cents in May.

Ceylon to Foster Rubber

The committee appointed in 1927 to consider the establishment of a State mortgage bank in Ceylon recommends that the capital of the proposed institution should be limited to 25,000,000 rupees ($9,375,000), to be raised by the issue of debentures having a currency of 25 years. In addition to subscribing 3,000,000 rupees the Government should guarantee the interest and capital and provide for periodic inspection of the bank's accounts. The purpose of the bank is to finance only agricultural enterprises, especially those connected with rubber and tea cultivation.

LARGER EXPORTS IN 1929 FOR CANADIAN FOOTWEAR

Canadian exports of rubber boots and shoes to foreign countries during the first six months of 1929 numbered 728,333 pairs valued at $1,054,397 and canvas rubber-soled footwear was shipped to the amount of 4,082,758 pairs valued at $2,748,509. This compares with 633,416 pairs of rubber boots and shoes valued at $1,103,483 and 3,536,692 pairs of canvas rubber-soled footwear valued at $2,558,768 shipped from Canada in the first half of 1928.

Lower unit prices held down the total values of Canadian exports this year, despite the heavy increase in the number of pairs shipped. The United Kingdom was the principal destination of shipments of both classes of rubber footwear. Argentina ranked as second largest customer for Canadian canvas rubber-soled footwear and New Zealand second for rubber boots and shoes.

PATENT IS GRANTED FOR NEW RUBBER SUBSTITUTE

Patents have recently been granted to E. Kleiber and P. Gilardi, of Lugano, Switzerland, for a method of producing a synthetic rubber that leaves a resinous composition as a residue. An elastic mass capable of being vulcanized and used as a rubber substitute is obtained, according to the inventors, by treating pertoleum with nitric acid or with sodium peroxide in the presence of soda lime or sodium acetate or with other oxidizing agent and distilling the neutralized liquid so obtained repeatedly over colophony, heating the distillate with dilute alkali under pressure causing separation into three layers, and treating one or both of the upper layers with a rubber promotor, *e.g.*, by adding glacial acetic acid and formaldehyde and raw rubber.

From a syrup-like mass thus obtained, an elastic mass capable of being vulcanized is obtained by the addition of actone or alcohol. The residue obtained after the distillation over colophony is a hard resin which may be used as a substitute for copal for varnish.

GUTTA PERCHA WORKS DENIES MERGER RUMOR

The directors of the India Rubber, Gutta Percha & Telegraph Works Company, London, England, have stated that there is no foundation for various rumors as to impending combines or amalgamations affecting the company. In a report on the company's progress, the directors say that, although there is a small aggregate improvement during the first half of 1929 over the same period last year, the actual results are still far from satisfactory.

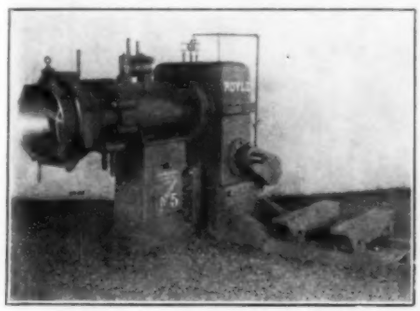
The output of the Silvertown factory has been fairly well maintained, but only at reduced selling prices in several important sections. Everything possible is being done to meet the resultant loss of profit, the directors state, by increasing sales and reducing expenses. No dividends are being paid on the ordinary shares, but the preference dividends are still being distributed.

CATALPO
for
Cushion Stocks

New Equipment for Rubber Factories

Royle Strainer With Enlarged Head

A new principle in strainer construction is involved in the recently announced 8-inch strainer No. 5, manufactured by John Royle & Sons, Paterson, N. J. The main departure from customary construction is in the enlarged head which is twice the diameter of the head on the regular model. The strainer head on the 8-inch size is 16 inches in diameter, of the 8 bolt type, with steam and water circulation. The screen plate has 5-16-inch holes and a screen of any desired mesh can be used.



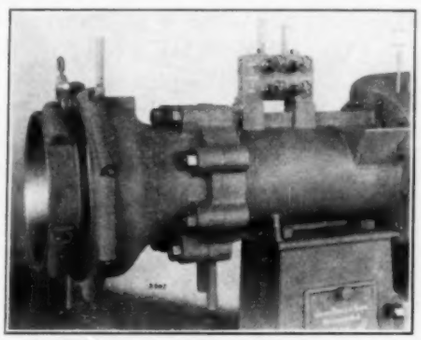
Royle 8-Inch Rubber Strainer

The thrust bearing of the No. 5 strainer is a Timken Tapered Roller, which requires less starting and operating power on account of the elimination of the greater portion of friction. Previous models had marine type thrust bearings.

Another feature of this strainer is the use of an automatic oil pump for lubricating all moving parts. Instead of the gears rotating in a bath of oil, the pump brings the oil up and drops it over the gears.

The capacity of this 8-inch strainer is 2,000 pounds of plantation rubber per hour through a 35 mesh screen. The temperature of the material at the outlet is considerably lower than in the regular model and varies in proportion to the mesh of screen used. By adjusting the screen size, suitable breakdown and removal of foreign matter is obtained.

A specially designed water cooled stock screw is used. Operating speed is from 14 to 41 r.p.m. The worm and wheel drive is a Cleveland No. 800 with a ratio of 29½ to 1. A 75 H.P. motor is required, operating at 400 to 1,200 r.p.m.



View of Strainer Showing Enlarged Head

The strainer complete, without motor, weighs approximately 13,900 pounds and requires about 9 feet by 9 feet, 8 inches, floor space.

New Gammeter Super-Shell

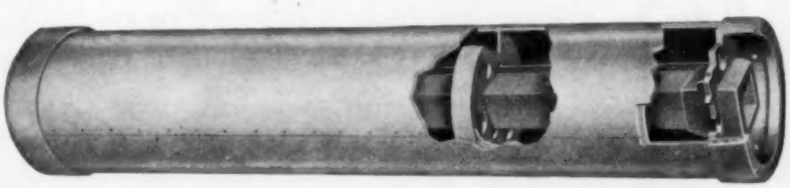
AFTER a year's research to determine just what was necessary to produce a calender shell which would end costly repairs and hold-ups in production, the F. W. Gammeter Company, Cadiz, Ohio, have recently introduced their new Super-Shell to the rubber industry. In this work the Gammeter Company has had the collaboration of the engineering departments of several of the largest rubber mills.

Tests proved that the small square mandrel universally used needed all the support possible to enable it to stand the extremely heavy loads of modern production; hence the Super-Shell was built to give this support. It was also proved that by the heads of a shell working loose too great a strain was placed on the central tube, consequently the entire shell assembly broke down. Then it was decided that a shell body depending upon rivets along its lateral seam was not sufficiently strong to insure long life.

Therefore, the Super-Shell was first built with a body having no rivets being made up of two thickness No. 19 gauge furniture steel with flush butt joints opposite each other and spot welded. The head of this shell is certainly unique, inasmuch as it is "keyed" to the body and will stand all the strain and torque that can be applied without depending upon a single rivet. The rim of the head is tapered and has a depression in its edge: after the head is placed inside the body a ring member is forced on under trtmendous pressure which "keys" the body to the head and curls the end of the body into the recess in the rim.

The mandrel opening was extended considerably to prevent a mandrel being inserted far enough into the shell to break down the central tube when a mandrel is used to pry a loaded shell into position.

It was found that the greatest strain on a shell body came at the ends where the stock cooled more rapidly. The Super-Shell was reinforced at this point by having a No. 14 gauge member extend from the head up to and engaging the first internal spider.



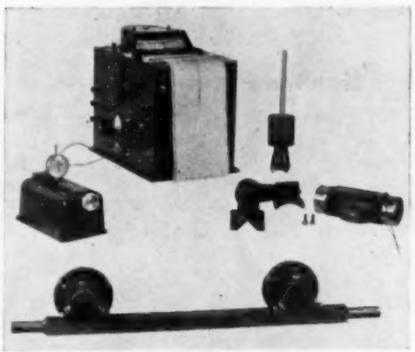
Schuster Thickness Gauge

A NEW magnetic thickness gauge, designed especially for the rubber industry and known as the Schuster Gauge has been recently developed by the Magnetic Gauge Company, 370 Water Street, Akron, Ohio.

The gauge will indicate and record to .0001 of an inch the thickness of any non-magnetic material while this material is in motion, such as rubber on a calender roll.

The gauging outfit consists of three units. First—a meter panel of the zero center type which reads from 0 to 5 both to the right and left of zero. Second—a setting device with a dial similar to the standard hand gauge used in most rubber factories. Third—a magnet carriage specially designed with an electro magnet supported between two special steel rollers, which rest upon the stock while the stock is on the calender roll.

Any movement of this magnet carriage closer to or further away from the calender roll, idler or drum, will instantly be indicated on the meter. Any change in compounds will have no effect upon the meter as the instrument reads thicknesses only.



Component Parts of Schuster Gauge

To operate the gauge the operator simply adjusts the setting device so that the little hand on the dial is pointed to the thickness required, say for example 15-1000. He allows the rollers of the magnet carriage to rest upon the calender roll and starts his calender, the stock passing under the rollers. He then adjusts his calender rolls to the point where the large meter hand rests at zero. When that is done his stock is 15-1000 thick. No gauge cuts are necessary. All that the operator has to do to insure perfect gauge is to keep the hand at zero. Any deflection of the meter either to left or right of zero shows him in tenths of thousandths of an inch that his stock is running thin or thick. He then adjusts his calender accordingly.

Current Crude Rubber Items

FORD SEES MORE RUBBER STIMULANT TO INDUSTRY

Henry Ford in a recent interview given to the North American Newspaper Alliance declared his belief that his vast Brazilian rubber concession would prove a stimulant to the rubber industry. "It has been suggested," he said, "that there is a possibility that the development of a 4,000,000-acre rubber plantation in Brazil may ruin the rubber market. The reverse is true.

"The more the better it will be for the rubber industry all the way through—and that applies to synthetic rubber as well. Prices will keep up instead of dropping, for surplus of rubber will force new uses. There are thousands of new uses for rubber in its different forms, but we will never discover all these until we produce so much that we will have to study how to utilize it. Supply makes demand, and then demand increases the supply.

"It was only a few years ago that rubber floors came into use. We looked at them with a bit of suspicion. Now they are in great demand. Rubber for top-dressing of pavements is being tried. There is a probability that it will prove as good as anything now used, possibly better. We are reaching a point where our chief materials will not be the things we mine, but the things we grow."

Rubber Futures Decline

Price quotations for rubber futures on the Rubber Exchange of New York, Inc., dropped a cent or more a pound on all the active positions during the past fortnight. The closing spot price on August 17 was 19.60 cents a pound as against 20.60 cents on August 5, but the more distant positions had fallen off from 110 to 140 points. The table below shows the daily fluctuations in prices and the daily sales volume.

Canada Imports More Rubber

Canadian imports of crude rubber were 6,235 long tons, or 42.8 per cent greater in the first six months of 1929 than in the same period of 1928. Total imports for the first half of this year were 20,817 long tons, valued at $10,111,772, as against 14,582 long tons, valued at $10,320,789 in the like period of last year. The drop in value with the increase in quantity is explained by the fact that the average cost per pound of such rubber was 21.68 cents in the 1929 period and 31.60 cents in the 1928 period.

RUBBER SHARES VALUABLE FOR INVESTMENT TRUST

Sir Ivor Philipps, chairman of the British Industries & General Investment Trust, pointed out at the recent annual meeting of the company that between June, 1928, and June, 1929, there was an appreciation of £51,000 in the shares of the concern. Between June 30 last and July 22, there was a further rise in value of £20,000. He expressed the opinion that a rise in the value of rubber to 1s., 1s. 3d., or 1s. 6d., would be followed by a considerable increase in general share values.

He instanced the case of a popular share like Bukit Mertajams, a company with an issued capital of £300,000 in 2s. shares. That company, producing at about 6d. per lb., can earn 20 per cent with rubber at 1s., 30 per cent if it rises to 1s. 3d., and over 40 per cent should it be 1s. 6d. Today the shares are valued at 4s. 6d.—125 per cent above par. Conservative estimates of the price at the higher commodity values would be 6s. and 8s. respectively. In Sir Ivor's view there is no need for anything like a boom in rubber to bring about better prices for rubber shares.

SEES EUROPE EQUALLING U. S. IN USE OF RUBBER

Encouraging statements as to the outlook for the plantation and for that of the industry generally were made by R. F. McNair Scott, chairman of the Anglo-Java Rubber & Produce Co., in his address recently at the general meeting in London. In regard to the company, which extended its operations last year by taking over large Malayan estates, he said they had been able to bring production costs substantially below the figures estimated at the time the Malayan estates were taken over, to have been the average for seven years. According to the prospectus issued in January, 1928, that average was 6.33d. per lb. f.o.b. Mr. Scott added that each penny per lb. profit on the estimated crop (10,200,000 lbs.) was equal to 5.8 per cent on the capital that has been issued.

Dealing with the future of rubber, Mr. Scott emphasized the effect of the steady restoration of economic conditions on the continent of Europe. He pointed out that Europe had a population four times as large as America, that before the war European countries in the aggregate consumed more rubber than America, and that the motor industry in Europe, long held back as a result of the war, was now increasing by leaps and bounds. In 1927 American consumption was 75 per cent of the world's production, but while in 1928 and up to last June America's requirements increased to an unexpected extent, the proportion she now takes is only about 62 per cent. Mr. Scott argued from these figures that before long the requirements of the rest of the world might equal those of America, notwithstanding the continued increase in the latter's rubber consumption.

Closing Prices on Rubber Exchange of New York, Inc.

FROM AUGUST 6 TO AUGUST 17, 1929

		Spot	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sales*
Aug.	6	20.50	20.50	21.00	21.30	21.70	22.10	22.30	22.50	22.70	23.00	23.30	23.50	23.70	67
	7	20.50	20.50	21.00	21.20	21.60	22.00	22.20	22.40	22.50	22.90	23.20	23.40	23.60	213
	8	20.40	20.40	20.90	21.20	21.60	22.00	22.10	22.30	22.50	22.90	23.20	23.50	23.70	252
	9	20.30	20.30	20.80	21.10	21.50	21.80	22.00	22.20	22.40	22.80	23.20	23.40	23.60	305
	10	20.40	20.40	20.90	21.10	21.50	21.80	22.10	22.30	22.50	22.90	23.20	23.40	23.60	63
	12	20.20	20.20	20.70	21.00	21.30	21.60	21.80	22.00	22.20	22.60	22.90	23.10	23.30	216
	13	20.20	20.20	20.70	21.00	21.30	21.70	21.80	22.10	22.30	22.60	22.90	23.10	23.30	431
	14	20.20	20.20	20.70	20.80	21.20	21.70	21.80	22.00	22.20	22.50	22.80	23.00	23.20	875
	15	19.90	19.90	20.40	20.50	20.90	21.20	21.50	21.60	21.80	22.00	22.20	22.40	22.60	623
	16	19.80	19.80	20.30	20.50	20.90	21.20	21.30	21.50	21.60	22.00	22.30	22.50	22.70	544
	17	19.60	19.60	20.10	20.30	20.70	21.00	21.20	21.40	21.50	21.80	22.00	22.20	22.40	230

*In lots of 2½ tons each

CATALPO
for
Inner Tubes

INTERNATIONAL PULP CO., *41 Park Row, New York, N. Y.*
SOLE PRODUCERS OF PURE **ASBESTINE** SPECIALLY PREPARED FOR USE IN RUBBER
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LIBERAL WORKING SAMPLE FURNISHED FREE

Rubber Goods and Specialties

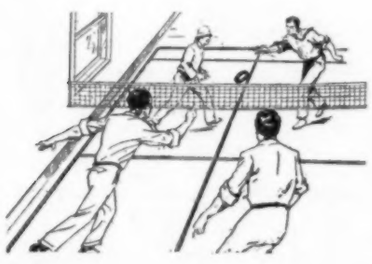
"Air-Safety" Rubber Bumper

A patent covering a new type of molded rubber bumper for automobiles has been recently granted to the inventor, Cameron Spear, Oak Treet, N. J. (U. S. P. 1,724,431). The rubber bumper, as shown in the accompanying illustration is attached to the steel bumper and acts as a cushion. It is ribbed to give stiffness but is hollow with

small vents to permit passage of air. It is made with either straight or curved ends and also in bumperette models, and in circular D shaped or modified circular designs. All styles have ball shaped ends. It can be attached to the spring bumpers by means of bolts which are fastened to a plate molded in the projecting bosses. The blow or contact with any object struck is taken up by the air filled tube which acts as a cushion. The tube itself is 4½ inches in diameter. Manufactured by Air Safety Bumper Co., 50 Church St., New York City.

Quoitennis

Increasing popularity is reported for the game of Quoitennis, recently invented by Cleve F. Shaffer, which is being introduced on ocean liners, in universities, schools, gymnasiums, playgrounds, summer resorts and innumerable homes. In the new game only one article or game piece is used, called the Tenikoit, a hollow quoit made of



soft rubber and containing air vents. This is played over a net on a very small court by two or four players, without the use of any intermediate instruments such as a bat or a club. The Tenikoit is made carefully so that it will not be too "loggy" or too "live," too heavy or too light, so as to spoil the game. Quoitennis and Tenikoit patents, trade marks, and copyrights are controlled by the Dek Sales Company, 560 Sutter street, San Francisco, Cal., which manufactures the game.

Endless Tire Flap

An all rubber endless flap is being offered to the trade by the Fisk Tire Company, Chicopee Falls, Mass., to replace fabric flaps used in certain types of tires. The new endless flap, because of its elastic construction, conforms to the interior shape of the casing as well as the outside contours of the tube, overcoming trouble caused by wrinkles in ordinary flaps. The composition of the new flap makes it tough as well as pliable, which makes for long wear. It is tubed to correct thickness and sized to shape, which makes it glove fitting when properly assembled. Because of the texture, the flap does not shrink, but stretches and conforms to the shape of the tube surface when it is depressed or expanded. Perfect fit eliminates likelihood of shifting. The new flaps will be furnished as original equipment with the Fisk Rugged DeLuxe line of tires.

Rubber Vases

Rubber vases in a number of sizes and shapes and in a wide variety of attractive colors are the latest items added to the line of rubber goods sold by I. B. Kleinert Rubber Company, New York City. They have all the appearance of high grade pottery. The vases are made of semi-hard rubber with a weighted base and are available in either a glossy solid colored finish or in mottled designs and are especially adaptable for store or decorative display purposes or where there would be constant handling and a liability of breakage. One suggested use for them is on ships at sea where violent tossing would make glass vases impractical of use.

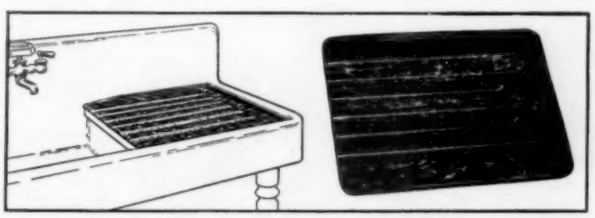
Hinson Golf Bags

The Hinson Manufacturing Company, Waterloo, Ia., is now making a new line of golf bags with many original constructional features. A solid molded rubber top eliminates any marring of club handles and prevents clubs from slipping out of the bag when it is carried at an angle. The handle is of pliable molded rubber, reinforced with spring steel, properly shaped for balanced carrying. A heavy molded rubber bottom also prevents injury to clubs and leaves no metal to be marred or dented. The bag illustrated is a three stay bag with hood and full length ball pocket equipped with talon fastener. There are six other styles in the line.

Eaton Tire

For motorists with obsolescent cars who drive only moderate distances and do not wish to invest in tires of standard quality giving present day extreme mileage, the Triangle Tire & Rubber Company, Canton, O., has entered into production on a new line of tires in popular high pressure and balloon sizes to be known as the Eaton. The Eaton tire, while not guaranteed, will give reasonable service, according to the manufacturers, as the finest possible workmanship and materials have been built into these casings commensurate with the low prices. Production on the company's regular lines still continues, and sales of Triangle cord tires and Fits Rite molded tubes have maintained a uniformly high ratio in comparison with the firm's total manufactured output.

Stedman Introduces Household Drain Mat



MADE of the same reinforced rubber used in the firm's floor tile, this new household drain mat brought out by the Stedman Products Company, South Braintree, Mass., is designed to protect both the drain board of the enameled sink to be found in most homes and the china and glassware which are placed on it after washing. The mat, while impervious to wear and non-absorptive, has a sufficient degree of resiliency to eliminate the chipping hazard that is present when dishes are placed directly from the dishpan to the enameled drain board. The mat is made in four colors in a standard size of 14¾ by 20¾ inches.

FIDELITY AND AMERICAN COMPLETE MERGER PLANS

The merger of the sales and manufacturing departments of the American Tire & Rubber Corporation, Akron, Ohio, with the Fidelity Tire & Rubber Company, Warren, Ohio, has been completed. All business is now being conducted from Warren.

An entirely new super tire, called the American Ace, manufactured in all sizes of balloons, has been enthusiastically received by the trade. Many worth-while features are included in this tire, including a heat-resisting red gum inner cushion, a new and distinctive tread design of unusual depth and non-skid safety, pure gum friction, low steam cure, etc.

Laboratory and road tests of the new American Ace, according to C. E. Pumphrey, vice-president and general manager of Fidelity, show unusually high wearing qualities. Of particular interest is the extremely high tensile strength of the tread, secured by low temperature vulcanization.

U. S. Tires Make Record

Tire mileage records ranging as high as 75,000 miles and in many cases 60,000 and upward are reported by the Detroit Department of Street Railways, which operates 559 motor buses and coaches and has the largest fleet using pneumatic tires of any municipally owned and operated system in the world. Tires of the United States Rubber Company are used exclusively, being leased to the department on a mileage basis, with accurate records kept of the exact mileage rolled up. As 85 per cent of the buses are of the dual wheel type, nearly 3,200 tires are in almost constant operation.

The Philadelphia Rubber Works Company

Manufacturer of

RECLAIMED RUBBER

of

STANDARDIZED QUALITY

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Address replies to Box Numbers
THE RUBBER AGE
250 West 57th St., New York City

SITUATIONS WANTED

AMERICAN, former Chief Chemist large Canadian tire plant, with eleven years' experience, nine years with two large firms in Akron, Ohio, wishes to communicate with rubber firm having opening in executive personnel. Thoroughly conversant with most modern developments of straight line methods of tire and tube production. Address Box 533, THE RUBBER AGE.

TEN YEARS experience manufacturing Baby Pants, Bathing Caps, Aprons and Novelties. Can design, originate and improve methods. Factory and office ability. Desire new connection. Age 33; Married. Address Box 525, THE RUBBER AGE.

RUBBER CHEMIST, degree in Chemical Engineering. Development or compounding work. Experience includes tires, tubes and mechanical rubber goods as chief chemist and factory production work. Practical and dependable. Desire to make permanent connection with a responsible company. Address Box 532, THE RUBBER AGE.

HELP WANTED

AN ESTABLISHED company in the Eastern district desires experienced chemist for laboratory-factory control work on tires and mechanicals. Applicants must be familiar with chemical and physical testing of materials. Man in this work age 25-35 with some compounding and factory experience preferred. Applications should contain training and experience to date, present employment, and salary expected. Address Box 526, THE RUBBER AGE.

FIRMLY established manufacturing company in middle-western city, offers splendid opportunity to young man not over thirty-five years of age to make a good place for himself in its factory. Success in the job will depend largely upon hard work, ability to manage, open-mindedness, searching ability and enthusiasm. Address Box 529, THE RUBBER AGE.

RUBBER CHEMIST: With general experience as assistant to chief. Well established midwest factory. State positions held, age, whether married. Salary expected. Address Box 531, THE RUBBER AGE.

FOR SALE

HAVE a modern and fully equipped rubber dipped goods plant will sell outright or take stock in same; will also consider a merger. Building of fireproof construction and practically new. Address Box 528, THE RUBBER AGE.

MISCELLANEOUS

WANTED MANUFACTURING PLANT
A CORPORATION desires to purchase a manufacturing plant that is now manufacturing tires or molded mechanical goods; give full particulars in first letter. Address Box 530, THE RUBBER AGE.

ADDRESS WANTED
PRESENT whereabouts of Carol Palinske, formerly of Milwaukee. Address Box 527, THE RUBBER AGE.

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PRACTICAL SOFTENERS

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You Cannot Afford to Be Without Them

DAMASCUS MANUFACTURING CORP.

CLEVELAND, OHIO

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EMBOSSING CALENDERS

For Artificial Leather, Oil Cloth,
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DRYING MACHINES

with Copper or tinned iron Cylinders for Cotton Ducks, Drills and Sheetings

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PROVIDENCE, R.I.

The

GENERAL

TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

LATE MARKET PRICES

Crude, Scrap & Reclaimed Rubber - Cottons and Fabrics

NEW YORK, AUGUST 20, 1929

COTTON

THE estimate of the government Crop Reporting Bureau as of August 1 that the production of cotton this season would be 15,543,000 bales was a little above most expectations and had a tendency to depress the price and to encourage the trade to postpone the filling of their new crop requirements. During the second week of the past fortnight, the decline was stopped briefly by reports of high temperatures and drought causing deterioration, resulting in an upward reaction of $2 a bale. The downward trend was resumed, however, after government weather reports failed to confirm the rumors of widespread deterioration.

The instability of the raw material has unsettled the domestic cotton textile markets, but statistics published by the Association of Cotton Textile Merchants of New York show that mill curtailment during July was sufficient to ensure the development of a healthier situation.

High, low and closing prices quoted on August 20 were as follows:

	High	Low	Close	Close
	Aug. 20			Aug. 6
Aug.	—	—	18.58	18.64
Sept.	—	—	18.60	18.80
Oct.	18.85	18.70	18.70	19.00

Tire Fabrics

June consumption of cotton fabric in the tire industry, according to the Rubber Manufacturers Association, was 27,145,249 pounds as against 31,069,490 pounds in May. Total consumption for the first six months of 1929 is put at 171,699,768 pounds as compared with the estimate of 171,000,000 pounds made by THE RUBBER AGE a month ago. It would appear that in the first eight months of 1929, approximately 219,000,000 pounds of cotton fabric will have been used by the domestic tire industry. Prices closed as follows:

CORD			
Peeler, carded, 23/5/3	lb.	.47 @	.48
Peeler, carded, 23/4/3	lb.	.48 @	.49
Peeler, carded, 13/3/3	lb.	.44½ @	.45½
Peeler, carded, 15/3/3	lb.	.45 @	.46
Egyptian, carded, 23/5/3	lb.	.53½ @	.54
Egyptian, combed, 23/5/3	lb.	.57½ @	.58
CHAFERS			
Carded, American, 8 oz.	lb.	.40 @	.41
Carded, American, 10 oz.	lb.	.40½ @	.41½
Carded, American, 12 oz.	lb.	.40½ @	.42½
Carded, American, 14 oz.	lb.	.39 @	.45
LENO BREAKER			
Carded, American, 8¼ oz.	lb.	.40 @	.46
Carded, American, 10¼ oz.	lb.	.40 @	.46
SQUARE WOVEN			
Carded, American, 17¼ oz. 23-11 ply	lb.	.47 @	.48
Carded, American, 17¼ oz. 10-ply	lb.	.39 @	.40

Sheetings

Late sheetings prices, as reported by the Textile Brokers Association, were as follows:

40-inch, 2.50-yard	yd.	— @	.12½
40-inch, 2.85-yard	yd.	— @	.11
40-inch, 3.15-yard	yd.	— @	.11
40-inch, 3.60-yard	yd.	— @	.09½
40-inch, 3.75-yard	yd.	.08⅞ @	.09
40-inch, 4.25-yard	yd.	.07½ @	.07⅝

Ducks

Although in a normally quiet month, manufacturers of cotton duck report better conditions than was the case a year ago. Ducks were in light to moderate demand during the past fortnight, but most of the reported transactions involved only small commitments. Some fair sales of enameling ducks are reported as of recent date, although some have accepted highly competitive prices. Prices closed as follows:

Belting and Hose	lb.	.35 @	.36
Enameling	lb.	.31 @	.36
Single filling	lb.	.14½ @	.16
Double filling	lb.	— @	.18

RECLAIMED RUBBER

The reclaimed rubber industry has been enjoying its biggest year in 1929, consumption being nearly 20 per cent above that of last year. A slight slackening up in demand has been noticed, however, after the consumption of over 160,000 long tons thus far since January 1. Stocks on hand of 19,679 long tons of reclaimed rubber as of July 31 were not considered high for this time of the year. Prices closed the fortnight as follows:

High Tensile			
Super-Reclaim No. 1 Black	lb.	.12¼ @	.12½
Super-Reclaim No. 2 Black	lb.	.11¾ @	.12
High Tensile Red	lb.	.12 @	.12¼
Shoe			
Unwashed	lb.	.07 @	.07¼
Washed	lb.	.09¾ @	.10
Tube			
No. 1 (Floating)	lb.	.13 @	.13½
No. 2 (compounded)	lb.	.10¼ @	10½
Tires			
Black	lb.	.07½ @	.07¾
Black, selected tires	lb.	.07¾ @	.08
Dark Gray	lb.	.10 @	.10¼
Light Gray	lb.	.12 @	.12¼
White	lb.	.12 @	.12½
Truck, Heavy Gravity	lb.	.07 @	.07¼
Truck, Light Gravity	lb.	.07¼ @	.07½
Miscellaneous			
Mechanical Blends	lb.	.07 @	.07½
Red	lb.	.12 @	.12½

Scrap Rubber

Scrap rubber demand has fallen off slightly, but prices have not shown any tendency to go lower. A significant comparison is to be found in the fact that the unit value of all types of scrap rubber exported from the United States in the first half of 1929 was 4.78 cents a pound as against 5 54 cents a pound in the first six months of 1928. Late prices follow:

(Prices to Consumer)

Auto tire peelings	ton	42.50 @	45.00
Standard White auto	ton	47.50 @	50.00
Mixed auto	ton	26.50 @	27.50
Bicycle tires	ton	20.00 @	22.50
Clean solid truck tires	ton	24.00 @	25.00
Boots and shoes	cwt.	1.45 @	1.50
Arctics, untrimmed	lb.	.00⅞ @	.01
Inner tubes, No. 1	lb.	.08 @	.08¼
Inner tubes, No. 2, compounded	lb.	.04½ @	.04⅝
Inner Tubes, Red	lb.	.05¼ @	.05⅜
Air Brake Hose	ton	32.00 @	34.00
Rubber Hose	ton	17.50 @	20.00

CRUDE RUBBER

ON August 19, the closing spot price quotation for standard ribs on the New York outside market dropped below 20 cents a pound for the first time since May 4. The quotation was 19⅞ cents a pound, but heavy buying on the following day brought the price back to 20¼ cents. Distant deliveries showed a decline of a full cent from the quotations at the end of the previous fortnight.

There was a brief revival of bullish sentiment upon the release of the Rubber Manufacturers Association's report of 41,526 long tons consumed in July, but the downward tendency was resumed a day later. There has been comment on the heavier shipments from Malaya to the United Kingdom, but it is pointed out that such shipments have for some time been exceptionally light. London stocks have remained consistently low, and new shipments are needed to bring supplies in England up to normal.

The upward turn at the close of the period came as a surprise and caught the shorts unawares, but it is felt that the rally was overdue and nothing more or less than a correction of the technical position. A renewal of liquidation was looked for in some circles, together with an accompanying drop in prices to still lower levels.

Prices quoted on the New York outside market on August 20 were as follows:

Plantations—			
Ribbed Smoked Sheets—			
Spot	.20¼ @	.20⅜	
Aug.-Sept.	.20¼ @	.20½	
Oct.-Dec.	.20⅞ @	.21⅛	
First Latex, crepe spot	.21 @	.21¼	
Amber Crepe, No. 2	.17¼ @	.17½	
Amber Crepe, No. 3	.17 @	.17¼	
Amber Crepe, No. 4	.16¾ @	.17	
Brown Crepe, Clean thin	.17 @	.17¼	
Brown Crepe, specky	.16¾ @	.17¼	
Liquid Latex, per gal.	1.00		
Paras—			
Up-river Fine	.21½ @		
Up-river Medium	Nominal		
Up-river Coarse	.11¼ @	.12	
Acre Bolivian, fine	.22 @		
Caucho Ball, Upper	.11¼ @	.12	
Islands, fine	Nominal		
Centrals—			
Central, scrap	.11½ @	.12	
Esmeraldas	.11½ @	.12	
Balata—			
Block, Colombia	Nominal		
Block, Ciudad	.54 @		

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers

Spot	@	10¼d
Aug.-Sept.	10¼d @	10⅜d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers

Spot	9½d @	9⅝d

For Rubber Compounding

C. K. WILLIAMS & CO. ANCHOR BRAND DRY COLORS AND FILLERS EASTON, PA. U.S.A.

IRON OXIDES

Asbestine
Barytes
Soapstone
Talc

C. K. WILLIAMS & CO.
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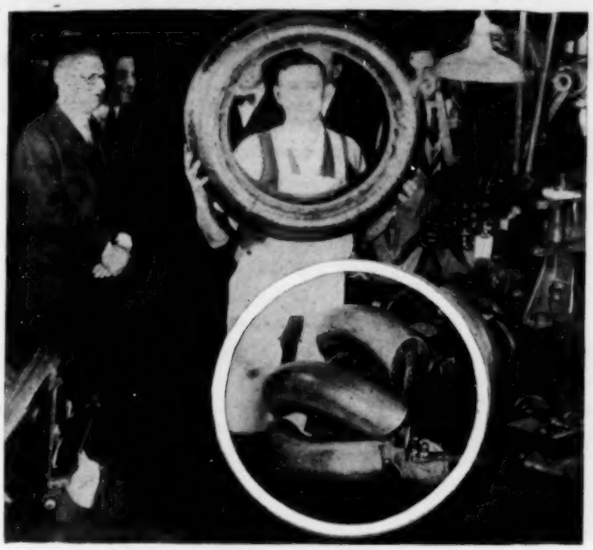

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In the Quiet and Exclusive Chelsea Section

500 Rooms with Sea Water Baths
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Sea Water Swimming Pool—Concert Orchestra—Turkish and Cabinet Baths—Spacious Sun Deck—Fireproof Construction

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BOARDWALK AT ALBANY AVE.

The Unexcelled Softener

ARLINGTON MILLS

DEGRAS

PURE WOOL GREASE

The Ideal Emollient for overcoming the surface tension of carbon black and effecting its complete and rapid dispersion in the rubber stock.

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The CARTER BELL MFG CO

CARTER BELL STANDARD SINCE 1903 RUBBER SUBSTITUTES

150 Nassau Street New York

LATE RUBBER CHEMICAL PRICES

Accelerators — Colors — Softeners — Compounding Materials

NEW YORK, AUGUST 20, 1929

SUPPLIERS of rubber chemicals and compounding ingredients find little decrease in the market for their products despite the reports of curtailments of production at the larger rubber goods factories in the country. The July rate of output at rubber plants was 15 per cent above estimates made by many authorities, and August has been showing only a slight reduction in production schedules.

Demand has been especially good from footwear factories and in only slightly less degree from plants manufacturing waterproof materials, mechanical goods, druggists' sundries and toys and novelties. The seasonal slackening up of production in tire factories has, therefore, had less serious effect upon the amount of chemicals consumed by the industry as a whole than in past years.

ACCELERATORS

Organic				
A-7	lb.	.55	@	.59
A-11	lb.	.62	@	.66
A-16	lb.	.57	@	.61
A-19	lb.	.58	@	.62
A-20	lb.	.64	@	.68
Accelerator 102	lb.			
Accelerator 552	lb.			
Accelerator 808	lb.			
Accelerator 883	lb.			
Aero-X	lb.	.60	@	.65
Aldehyde ammonia, crystals	lb.	.65	@	.70
Aniline oil, drums, f.o.b. works	lb.	.15	@	.16¼
Cryiene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.42	@	.52
Diphenylguanidine	lb.	.30	@	.36
Ethylidene anilene	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.34	@	.44
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.62½	@	.65
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.35	@	.45
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	.80
Para-Nitrosodimethylaniline, f.o.b. works	lb.	.92	@	.96
Piperidine-Piperidyldithio-Carbamate	lb.	4.45	@	4.60
R & H 40	lb.	.40	@	.42½
R & H 50	lb.	.40	@	.42½
R & H 397	lb.	.75	@	.77½
Safex	lb.	1.20	@	1.25
Tensilac, No. 39	lb.	.50	@	.52½
Tensilac, No. 41	lb.	.50	@	.52½
Thermio F	lb.	.50	@	.55
Thiocarbanilide, drums	lb.	.26½	@	.28½
Thionex	lb.			
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.62½
Ureka	lb.	.75	@	1.00
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Waxene	lb.	.30	@	.32
Z 88	lb.	.50	@	.60
Inorganic				
Lead, sublimed blue	lb.	.08¼	@	—
Lead, white	lb.	.10½	@	.12½
Litharge, domestic	lb.	.09	@	—
Magnesia, calcined, light	per 100 lb.	5.35	@	5.45
heavy	per 100 lb.	3.65	@	3.75

COLORS

Blacks (See Compounding Materials)				
Blues				
Prussian	lb.	.35	@	.40
Ultramarine	lb.	.06	@	.30
Browns				
Sienna, Italian	lb.	.05½	@	.12½
Umber, Turkey	lb.	.04½	@	.07
Greens				
Chrome, light	lb.	.27	@	.31
medium	lb.	.28	@	.31
dark	lb.	.31	@	.34
Chromium Oxide, bbl.	lb.	.31	@	.38
Reds				
Antimony crimson, 15/17	lb.	.44	@	.50
sulfur free	lb.	.52	@	.60
golden 15/17 F.S.	lb.	.20	@	.25
Indian English	lb.	.09	@	.12
Domestic (Maroon)	lb.	.08	@	.12
Oximony	lb.	.13¼	@	—
Red oxide, pure	lb.	.10	@	.12
Venetian red	lb.	.03	@	.06
Vermillion, quicksilver, English	lb.	1.95	@	—
Whites				
Lithopone, Akrolith	lb.	.05 3/5	@	.06
Lithopone, Azolith	lb.	.03¼	@	.05⅝
Lithopone, Vanolith	lb.	.05⅝	@	—
Titanox, f.o.b. St. Louis	lb.	.08½	@	.09
Titanium Calcium Pigment, f.o.b. St. Louis	lb.	.08	@	.08½
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06⅝	@	.06⅞
Zinc Oxide—French Process				
White seal	lb.	.11⅞	@	—
Green seal	lb.	.10⅞	@	—
Red Seal		.09⅞	@	—
Yellows				
Chrome	lb.	.16½	@	.17
Ocher, French medium	lb.	.02	@	.03
domestic	lb.	.01⅝	@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@	24.50
Ammonia carbonate	lb.	.10½	@	.12
Asbestine	ton	14.75	@	18.00
Barium carbonate	lb.	.02¼	@	.02½
Barium Dust	lb.	.05	@	.06
Barytes southern off-color	ton	12.00	@	18.00
Western prime white	ton	28.00	@	—
imported	ton	27.00	@	36.00
Basofor	lb.	.04½	@	—
Blacks				
Arrow "Aerfloted"	lb.	.08½	@	.12½
Bone Black	lb.	.07	@	.08½
Carbon, compressed	lb.	.08½	@	.12½
Carbon, uncompressed	lb.	.08	@	.12
Drop Black	lb.	.06	@	.10
Fumonex	lb.	.06	@	.09
Gastex	lb.	.04½	@	.08
Lamp Black	lb.	.12	@	.40
Micronex	lb.	.09	@	.13
Velvetex carbon	lb.	.04½	@	.06
Blanc fixe dry f.o.b. works	lb.	.03½	@	.03⅝
Carrara filler	lb.	.01¾	@	.02
Catalpo (fact.)	lb.	.02	@	—
Clay, China, domestic	ton	8.00	@	9.00
Aerfloted Suprex	ton	10.00	@	22.00
Congaree, c. l. f.o.b. mine	ton	9.00	@	—
Lexington	ton	10.00	@	22.00
Mineral Flour, c. l. fob mine	ton	20.00	@	23.00
Tensulite		15.00	@	—
Glues, extra white	lb.	.22	@	.26
medium white	lb.	.20	@	.24
Magnesia, carbonate	lb.	.07	@	.09
Mica (muscovite) 160 mesh				
White, water grnd., c.l.	lb.	.06	@	—
White, water grnd., ton lots, whse.	lb.	.07	@	—
White, water grnd., less ton lots, whse.	lb.	.08	@	—
Off color (biotite)	lb.	.05	@	.07
Rotten Stone (powdered)	lb.	.02½	@	.04½
Soapstone, powdered	ton	15.00	@	22.00
Starch, powdered	cwt.	3.30	@	3.70
Talc, domestic	ton	12.00	@	15.00
Whiting, commercial	cwt.	.85	@	1.00
English cliffstone	cwt.	1.75	@	2.00
Superfine	ton	10.00	@	12.00
Witco	ton	12.00	@	—
Wood pulp XXX	ton	45.00	@	—
Wood pulp X	ton	25.00	@	—
Zinc Carbonate	lb.	.09½	@	.10½
Zinc Stearate	lb.	.24	@	.25

MINERAL RUBBER

Genasco (factory)	ton	50.00	@	52.00
Montezuma, solid	ton	28.00	@	36.00
Montezuma, granulated	ton	32.00	@	42.00
Paradura	ton	62.50	@	65.00
Pioneer, MR, solid	ton	42.00	@	45.00
Pioneer-granulated	ton	52.00	@	55.00
R & H Hydro-Carbon	ton	27.05	@	29.00
Robertson, MR, solid	ton	34.00	@	36.00
M.R. (gran)	ton	38.00	@	40.00

SOFTENERS

Acids				
Nitric, 36 degrees	cwt.	5.00	@	5.25
Sulfuric, 60 degrees	ton	10.50	@	11.50
66 degrees	ton	15.00	@	16.00
Tartaric, crystals	lb.	.37	@	.38
Acids, Fatty				
Stearex	lb.	.15½	@	.20
Stearic, double pressed	lb.	.17	@	.22
Alkalies				
Caustic soda, 76%	cwt.	3.76	@	3.91
Soda ash, 58% C.L.	cwt.	1.40	@	
Oils				
Corn, refined, bbls.	lb.	.11	@	.11½
Cottonseed, crude		.08½	@	.08¾
Cycline	gal.	.27	@	.34
Degras (c.l. 100 bbls.)	lb.	.03¾	@	—
Less c. l. (10-25 bbls.)	lb.	.04	@	—
Lots less than 10 bbls.	lb.	.04¼	@	.04½
Fluxrite	lb.	.05	@	.06
Hexalin	lb.	.60	@	—
Acetate	lb.	.70	@	—
Linseed, Raw C.L. bbl.	lb.	.09½	@	.10
Palm Lagos	lb.	.07¼	@	.07½
Niger	lb.	.07¾	@	.08
Vansulol	lb.	.19½	@	—
Para-Flux	gal.	.17	@	—
Petrolatum, white	lb.	.08	@	.08½
dark amber	lb.	.03¾	@	.03¾
Pine, steam distilled	gal.	.65	@	.70
Witco Softener (f.o.b. works)	lb	.02	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.06½	@	.07½
coal tar	gal.	.05½	@	.06
pine, 200 lb. gr. wt.	bbl.	9.00	@	10.00
Rosin, grade K, 280 lb. bbl.	bbl.	8.85	@	—
Pigmentar	gal.	.33	@	.41
Solvenol, drums	gal.	.48	@	.50
Tarol, drums	gal.	.30	@	.35
Tar Retort, 50 gal.	bbl.	12.50	@	13.00
Solvents				
Acetone, pure	lb.	.13	@	
Alcohol denatured, No. 1 bbls.	gal.	.37½	@	.44½
Benzol, 90%	gal.	.28	@	—
Carbon bisulphide	lb.	.05½	@	.06¼
Carbon tetrachloride	lb.	.06¼	@	.07
Motor gasoline, steel bbls.	gal.	.17	@	—
Naptha, solvent	gal.	.35	@	.40
Turpentine, spirits	gal.	.60	@	.64
wood	gal.	.50	@	.54
Waxes				
Beeswax	lb.	.56	@	.58
Carnauba	lb.	.33	@	—
Ceresin, white	lb.	.10	@	.11
Montan, crude	lb.	.07	@	.07½
Ozokerite, black	lb.	.24	@	.25
green	lb.	.26	@	.30
Paraffin (c. l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.03¾	@	
White crude scale 124/126	lb.	.04	@	
Refined, 125/127	lb.	.05¾	@	
Refined, 128/130	lb.	.05½	@	
Refined, 135/137	lb.	.07¾	@	
Refined, 138/140	lb.	.08¼	@	
Miscellaneous				
RSL Mold Solution	gal.	.75	@	1.00

ANTI-OXIDANTS

Albasan	lb.	.70	@	.75
Antox	lb.			
Neozone	lb.			
Oxynone	lb.	.68	@	.80
Resistox	lb.	.54	@	.57
Stabilite	lb.	.54	@	—
VGB	lb.	.55	@	.66

SUBSTITUTES

Black	lb.	.08	@	.14
White	lb.	.10	@	.16
Brown	lb.	.08	@	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03¼	@	.03½
Sulfur flour, Refined, 100% pure (bags)	cwt.	2.40	@	2.75
Commercial (bags)	cwt.	1.75	@	2.10

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

AUTHORITIES who predicted marked declines in July consumption of crude rubber in the United States were once again surprised by the strength of the American industry. An absorption of 41,526 long tons, as reported by the Rubber Manufacturers' Association, was over 15 per cent above the estimates made by some experts. These same prognosticators are now asserting that, due to the July consumption being higher than expected, August will witness a far greater falling off than was previously looked for.

Tire output in June and rim production in July were low in comparison with previous months, as had been forecast. Final figures will probably show that net imports of crude rubber in July were from 3,000 to 4,000 tons under domestic consumption during that month. Despite this fact, the Rubber Manufacturers' Association figures for stocks on hand as of July 31 show a slight increase over the report for June 30.

The amount of rubber invoiced to the United States has been lower in the first two weekly reports for August. Shipments from London and Liverpool, which were over 1,500 tons in the first week of August last year, totaled just 10 tons for the week ended August 3, 1929. In the following week there were no shipments from England to this country.

Latest figures covering imports and exports from the leading producing and consuming countries have been added to the appropriate tables in this section.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available. The section accordingly affords the most up-to-date, complete and convenient statistical service in the industry.

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U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	18.26	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,482	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1927:							
Jan.	43,340	36,753,719	37.86	1,525	1,444,734	42.28	41,815
Feb.	28,337	23,110,257	36.41	2,451	2,277,297	41.47	25,886
Mar.	35,515	28,693,016	36.07	2,763	3,249,665	52.50	32,752
Apr.	46,202	37,321,505	36.06	1,575	1,428,425	40.48	44,627
May	36,518	30,984,377	37.88	2,782	2,501,562	40.14	33,736
June	33,045	27,850,014	37.62	1,775	1,550,592	39.00	31,270
July	37,677	31,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	35.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	27,671
Nov.	28,592	27,395,428	31.69	2,469	2,014,196	36.43	26,123
Dec.	30,787	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,107	30,278,444	34.56	1,988	1,734,990	38.95	37,119
Feb.	33,663	27,763,655	36.82	2,738	2,229,589	36.35	30,925
Mar.	40,611	32,103,042	35.29	3,718	2,587,435	31.07	36,893
Apr.	37,935	27,287,266	32.11	2,272	1,415,024	27.80	35,663
May	31,059	19,058,672	27.39	2,399	1,386,307	25.80	28,660
June	27,765	14,121,219	22.71	2,621	1,400,697	23.86	25,144
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,084,646	20.37	28,827
Sept.	39,835	16,512,019	18.50	3,038	1,384,148	20.34	36,797
Oct.	44,058	18,200,332	18.44	2,405	1,085,407	20.15	41,653
Nov.	36,519	14,878,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,738	1,165,743	19.00	40,773
1929:							
Jan.	57,564	22,872,943	17.74	3,663	1,773,401	21.61	53,901
Feb	64,265	24,760,111	17.20	2,955	1,374,783	20.77	61,310
Mar.	50,604	20,380,905	17.98	4,218	2,094,037	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.02	52,432
May	51,161	24,355,511	21.25	2,386	1,349,690	21.24	48,325
June	41,663	18,799,307	20.14	3,152	1,470,746	20.83	38,511
July*	34,842	15,473,458	19.83				
Aug.							
Sept.							
Oct.							
Nov.							
Dec.							

*Receipts at New York and Massachusetts.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1922	1923	1924	1925	1926	1927	1928	1929
Jan.	16,938	30,106	29,058	29,638	32,196	31,518	34,403	43,002
Feb.	14,767	30,149	25,736	19,761	31,136	30,137	33,702	41,594
Mar.	21,408	36,629	28,385	33,498	32,936	36,141	35,688	44,780
Apr.	19,294	29,085	27,129	34,139	32,696	35,871	32,772	47,521
May	23,246	36,155	25,845	35,322	29,364	34,592	37,333	49,233
June	31,713	24,272	22,753	35,822	28,598	33,801	37,676	43,227
July	24,522	17,685	23,396	36,053	27,577	29,219	37,407	41,526
Aug.	29,631	20,359	28,982	35,909	34,533	33,460	42,927	
Sept.	24,410	17,594	31,497	31,691	32,904	27,214	39,882	
Oct.	26,881	21,321	31,520	29,047	29,836	26,790	40,857	
Nov.	24,950	20,437	27,289	28,853	28,080	26,792	37,461	
Dec.	25,070	31,902	27,199	28,748	26,293	25,492	31,232	
Totals	282,560	305,694	328,769	388,481	366,149	371,027	441,340	

Figures on Quarterly Basis

Quarter	1922	1923	1924	1925	1926	1927	1928	1929
Jan./Mar.		96,776	87,609	95,263	94,301	99,216	103,558	128,565
Apr./June	127,360	89,493	75,674	104,099	87,109	103,242	103,500	
July/Sept.		55,621	83,813	99,493	93,793	89,210	117,573	
Oct./Dec.	155,067	63,617	92,656	85,789	83,212	80,860	117,597	
Totals	282,427	305,507	339,752	384,644	358,415	372,528	442,227	128,565

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
May 18	8,026	1,011	2,028	126	11,191
May 25	7,020	558	2,070	115	9,763
June 1	6,024	759	2,044	45	8,872
June 8	6,117	1,102	1,808	68	9,095
June 15	6,812	983	1,521	99	9,415
June 22	6,393	802	1,555	132	8,882
June 29	6,103	1,416	1,946	73	9,538
July 6	6,123	358	1,909	86	8,476
July 13	6,648	927	1,708	7	9,290
July 20	5,107	839	1,313	56	7,315
July 27	6,649	432	1,988	75	9,144
Aug. 3	4,784	780	1,251	10	6,825
Aug. 10	5,850	873	1,222	—	7,945

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1927																																
January	—	—	85⅛	89	89¾	40¾	40¾	—	—	40¾	40¾	40¾	40	39¾	39¾	—	39¾	38¾	39	38½	38¼	38⅝	—	38¾	38	38⅝	38¾	38	38	38	38⅝	38¾
February	87⅛	87⅛	87⅛	87½	87½	40¾	40¾	—	—	40¾	40¾	41⅛	40¾	39¾	39¾	—	39¾	38¾	39	38½	38½	41⅛	40¾	39	41¼	41⅛	41¼	41	41	41⅛	41	41
March	87⅛	89⅝	89⅝	40¾	41	40¾	41¼	—	—	41¼	41¼	41¼	41¼	41¼	41¼	—	41¼	41¼	41¼	41¼	41	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾
April	41⅛	41⅛	41⅛	41	41	41¼	41¼	—	—	41¼	41¼	41	40¾	40¾	40¾	—	40¾	40¾	40¾	40¾	40¾	40¾	40¾	41	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾
May	—	40¾	40¾	40¾	41	89⅝	89⅝	—	—	40¾	40¾	40¾	40¾	40¾	40¾	—	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	87¼
June	40¾	40¾	40¾	40¾	40¾	85⅛	85⅛	—	—	87¾	87¾	87¾	87¾	87¾	87¾	—	87¾	87¾	87¾	87¾	87¾	85¾	85¾	85¾	85¾	85¾	85¾	85¾	85¾	85¾	85¾	85¾
July	85½	85½	85¼	85¼	85½	84½	84½	—	—	84¾	84¾	84¾	84¾	84¾	84¾	—	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾	84¾
August	84	83¾	83¾	83¾	83½	83½	83½	—	—	83½	83½	83½	83½	83½	83½	—	83½	83½	83½	83½	83½	83½	83½	83½	83½	83½	83½	83½	83½	83½	83½	83½
Sept.	83⅝	83⅝	83¼	83¼	83⅜	83⅜	83⅜	—	—	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	—	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜	83⅜
Oct.	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	—	—	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	—	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛	85⅛
Nov.	86	86	85¾	85¾	86⅛	86⅛	86⅛	—	—	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	—	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛	86⅛
Dec.	40½	40¾	40¾	40¾	40¾	40¾	40¾	—	—	40¾	40¾	40¾	40¾	40¾	40¾	—	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾
1928																																
January	—	—	41¾	41¾	41¾	41	41	—	—	40¾	40¾	40¾	40½	40½	40¾	—	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¼	40¼	39¾	39¾	39¼	39	38¾	40¼
February	87⅛	87⅛	87⅜	87⅜	87⅜	86¾	87	—	—	86⅜	84⅝	84⅝	84⅝	84⅝	84⅝	—	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝	84⅝
March	29	28⅝	28⅝	28⅝	29	28⅝	26¾	—	—	25½	25½	24¼	24¼	24¼	24¼	—	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼
April	27⅛	27⅛	27⅛	27⅛	27⅛	27⅛	26¾	—	—	25½	25½	25½	25½	25½	25½	—	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½
May	17½	17½	17½	21¾	21¾	21¾	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
June	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	18⅝	—	—	18⅝	19⅜	19⅜	19⅜	19⅜	19⅜	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
July	19⅛	19⅛	19⅛	19⅜	19⅜	19⅜	19⅜	—	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
August	—	19⅛	19⅛	19⅜	19⅜	19⅜	19⅜	—	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
September	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	—	—	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	—	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝
October	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	—	—	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	—	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝
November	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	—	—	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	—	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝	18⅝
December	17¾	—	17¾	17¾	17¾	17¾	17¾	—	—	17¾	17¾	17¾	17¾	17¾	17¾	—	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾
1929																																
January	—	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	—	—	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	—	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛
February	22⅝	22	21⅝	21⅝	22¾	22¼	22¼	—	—	22¼	22¼	22¼	22¼	22¼	22¼	—	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼
March	26	26	26	26	26	26	25⅝	—	—	25½	25½	25½	25½	25½	25½	—	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½
April	23	23¼	22¾	22¾	22½	22½	22¾	—	—	22¾	22¾	22¾	22¾	22¾	22¾	—	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾
May	19⅝	19⅝	19⅝	19⅝	19⅝	20¼	20⅝	—	—	21½	21	21	21	21	21	—	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
June	21⅛	21⅜	21⅜	21⅜	21¼	21⅛	21⅛	—	—	21⅛	20⅝	20⅝	20⅝	20⅝	20⅝	—	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝
July	20⅜	21	21	—	21¼	21¼	22½	—	—	21⅝	22	22	21⅝	21⅝	21⅝	—	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Aug.	21⅝	21	21	—	21	21	21	—	—	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	—	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	45.70
1912	121.60	1916	72.50	1920	36.30
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents
Jan.	13.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.18
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59	20.64
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	——
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	——
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	——
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	18.26	——
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	——
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	22.48	——

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	May	June	July	Aug.	Day	May	June	July	Aug.
1	9⅞	10¾	10⅝	11	17	11⅝	10½	11	10¼
2	10	—	10⅞	11	18	—	10½	10⅞	—
3	10	10⅞	10⅞	—	19	—	10⅝	10¾	—
4	—	10⅝	10⅞	—	20	—	10½	10¾	—
5	—	10⅝	11	—	21	11½	10½	—	—
6	10¼	10½	11¼	10⅞	22	11⅜	10½	11	—
7	10⅜	10⅝	—	10⅞	23	10½	—	11	—
8	10⅝	10⅝	11½	10¾	24	10⅝	10½	10⅞	—
9	—	—	11½	10¾	25	10½	10½	11	—
10	10½	10½	11½	10¾	26	—	10½	11⅛	—
11	10⅝	10⅝	11½	—	27	10⅜	10⅜	11⅛	—
12	—	10⅝	11¼	10⅝	28	10½	10⅜	—	—
13	11	10⅝	11¼	10⅝	29	10¾	10⅝	11	—
14	11⅜	10¼	—	10⅝	30	10⅞	—	11	—
15	11½	10½	11¼	10½	31	10¾	—	11	—
16	11⅜	—	11	10⅜					

Average Monthly Price Per Pound

Month	1927 Pence	1928 Pence	1929 Pence	Month	1927 Pence	1928 Pence	1929 Pence
Jan.	19.410	19.310	9.942	Aug.	17.202	9.300	——
Feb.	19.021	15.713	11.875	Sept.	16.293	8.530	——
Mar.	20.125	12.736	12.135	Oct.	16.366	8.807	——
Apr.	19.897	8.864	10.490	Nov.	18.159	8.596	——
May	19.769	8.845	10.717	Dec.	19.690	8.570	——
June	17.880	9.293	10.580	Average for Year	18.375	10.656	——
July	16.770	9.312	11.065				

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	July	Aug.	Day of Month	July	Aug.	Day of Month	July	Aug.
1	18.20	19.20	11	18.20	——	21	——	——
2	18.20	18.85	12	18.35	18.10	22	19.00	——
3	18.35	19.00	13	18.25	18.30	23	18.75	——
4	——	——	14	——	18.15	24	18.60	——
5	18.35	18.90	15	18.00	18.00	25	18.80	——
6	18.35	18.95	16	18.35	18.20	26	18.70	——
7	——	18.95	17	18.90	18.35	27	18.65	——
8	18.60	18.35	18	18.85	——	28	——	——
9	18.70	18.10	19	19.20	——	29	18.75	——
10	18.55	17.95	20	19.45	——	30	18.90	——
						31	19.20	——

Average Monthly Price Per Pound

Month	1927 Cents	1928 Cents	1929 Cents	Month	1927 Cents	1928 Cents	1929 Cents
Jan.	13.42	19.12	20.22	Aug.	20.04	19.28	——
Feb.	14.10	18.40	20.21	Sept.	21.95	18.67	——
Mar.	14.32	19.38	20.19	Oct.	20.22	19.62	——
Apr.	14.75	20.63	20.29	Nov.	20.22	19.84	——
May	16.07	21.58	19.41	Dec.	19.58	20.22	——
June	16.85	21.50	18.74	Average for Year	17.49	19.97	——
July	18.00	21.36	18.62				

Stock of Crude Rubber in the U. S.

(All Quantities in Long Tons)

At End of	ON HAND			AFLOAT			ON HAND AND AFLOAT		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	76,172	110,244	76,342	45,312	41,256	78,596	121,484	151,500	154,938
Feb.	91,186	108,955	90,058	42,166	43,316	63,825	133,352	152,271	153,883
March	85,740	114,061	100,536	49,600	39,324	56,476	135,340	153,385	157,012
April	92,757	113,083	107,659	38,963	33,986	55,409	131,720	147,069	163,068
May	94,563	105,356	97,192	44,181	34,374	55,404	138,744	139,730	152,596
June	89,250	90,198	92,061	47,233	40,001	46,035	136,483	130,119	138,096
July	98,469	83,242	92,535	40,687	42,304	38,858	139,056	125,546	134,393
Aug.	96,148	68,994		40,937	51,875		137,085	120,869	
Sept.	97,829	68,851		37,966	48,566		135,793	117,417	
Oct.	97,452	66,421		42,804	41,571		140,256	107,992	
Nov.	101,034	61,956		37,076	68,119		138,110	130,075	
Dec.	100,130	66,166		47,938	68,764		148,068	134,930	

(Rubber Manufacturers' Association figures raised to 100%.)

Stock of Crude Rubber in London

(No. of tons in Wharves and Warehouses, including Latex)

At end of:	1921	1922	1923	1924	1925	1926	1927	1928	1929
Jan.	56,573	67,252	73,498	57,460	27,172	9,994	54,994	66,524	25,191
Feb.	59,439	67,623	70,483	56,732	23,425	10,004	58,826	62,964	25,554
Mar.	63,913	66,670	63,438	55,647	18,104	13,127	63,055	58,272	28,214
Apr.	68,759	68,637	58,770	54,559	12,949	18,773	66,897	53,425	31,368
May	70,403	70,146	54,439	51,615	5,895	20,384	67,169	44,628	31,290
June	69,408	71,597	51,050	51,115	5,318	23,984	63,902	38,756	
July	71,065	71,515	49,937	52,073	4,258	27,727	63,717	35,429	
Aug.	73,211	72,112	58,427	49,700	4,619	30,165	64,491	32,084	
Sept.	72,175	70,977	54,523	44,011	5,453	35,077	68,236	31,440	
Oct.	69,229	68,536	58,891	37,523	5,086	42,138	69,569	24,207	
Nov.	70,786	68,548	60,074	33,593	3,869	44,057	67,050	17,775	
Dec.	69,792	72,299	60,246	29,488	5,697	48,918	63,793	19,815	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1928					
August	34,294	33,649	32,591	32,815	———
September	31,933	31,477	32,110	31,884	31,462
October	29,525	27,370	26,477	24,240	
November	22,919	21,494	20,194	18,724	———
December	16,855	16,517	17,669	18,821	19,727
1929					
January	21,953	23,016	23,547	24,423	———
February	25,389	25,413	24,757	25,005	———
March	25,441	25,920	26,442	27,656	28,077
April	28,934	30,446	30,503	31,213	
May	31,580	31,127	30,955	30,893	———
June	31,539	31,635	31,127	30,617	30,982
July	29,996	30,661	30,790	30,167	
August	30,937	31,444			

Rubber in Singapore and Penang

(Stocks held by Dealers—Quantities in Long Tons)

End of	1927	1928	1929	End of	1927	1928	1929
Jan.	25,440	25,868	29,617	July	22,558	18,663	33,859
Feb.	26,766	22,867	32,373	Aug.	25,764	18,971	———
Mar.	27,844	20,538	29,437	Sept.	25,178	14,898	———
Apr.	24,543	16,946	26,474	Oct.	25,790	12,149	———
May	25,133	17,437	30,764	Nov.	28,369	29,188	———
June	21,898	18,207	30,403	Dec.	25,798	32,895	———

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1923	23,140,620	0.6	1926	24,199,524	78.8
1924	21,863,311	19.7	1927	19,700,003	79.1
1925	26,001,664	66.3	1928	24,247,282	81.6
1928			1929		
January	1,835,207	79.4	July	1,896,666	78.2
February	2,265,024	80.3	August		
March	2,613,389	80.4	September		
April	2,729,899	81.3	October		
May	2,574,224	76.5	November		
June	2,184,219	75.3	December		

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1925	1926	1927	1928	1929
January	14,386,000	17,582,000	17,888,000	20,938,000	22,602,000
February	13,210,000	15,814,000	18,240,000	21,136,000	22,776,000
March	14,890,000	19,302,000	22,464,000	24,041,000	28,495,000
April	19,013,000	20,848,000	23,371,000	25,712,000	32,019,000
May	20,459,000	24,213,000	26,579,000	27,355,000	34,117,000
June	20,724,000	23,803,000	27,799,000	29,022,000	33,693,000
July	22,879,000	24,752,000	29,784,000	30,960,000	
August	22,323,000	26,912,000	29,779,000	33,148,000	
September	20,177,000	22,929,000	28,409,000	29,691,000	
October	19,826,000	23,973,000	25,497,000	30,610,000	
November	18,024,000	20,618,000	24,400,000	26,222,000	
December	17,954,000	21,419,000	23,718,000	26,644,000	
TOTAL	223,865,000	262,165,000	297,928,000	327,932,000	

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928
Production	40,932	45,259	51,633	60,845	61,237	64,439	77,944
Shipments	39,987	45,204	50,120	59,262	59,002	64,059	74,296
Inventory[2]	6,132	5,772	7,427	8,142	10,456	10,264	13,624

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	4,965	5,358	6,722	4,932	5,394	6,626	10,432	9,949	13,712
Feb.	5,095	6,363	6,912	4,458	5,031	5,282	11,075	11,721	15,496
Mar.	6,276	6,819	7,519	5,701	5,731	6,708	11,583	12,389	16,351
Apr.	6,299	6,178	7,884	5,701	5,812	7,294	12,122	12,717	16,929
May	6,151	6,759	8,145	5,657	6,457	7,184	12,462	13,024	17,849
June	6,202	6,692	7,304	6,253	7,117	7,254	12,462	12,162	17,957
July	5,087	6,498		5,973	7,895		11,326	11,157	
Aug.	5,752	7,469		6,393	8,403		10,721	10,034	
Sept.	4,822	6,802		5,717	7,145		9,722	9,765	
Oct.	4,773	7,326		4,799	5,717		9,665	11,520	
Nov.	4,502	6,075		4,306	4,998		10,136	12,579	
Dec.	4,497	5,605		4,165	4,591		10,264	13,624	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928
Production	50,850	60,116	70,706	82,614	76,618	70,823	80,180
Shipments	49,673	59,072	68,016	81,004	71,591	72,896	77,127
Inventory[2]	7,643	8,425	11,052	11,313	16,200	13,692	16,117

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	5,337	5,441	6,517	6,016	6,072	7,242	15,585	12,982	15,386
Feb.	5,658	6,895	6,769	5,120	5,431	5,278	16,075	14,650	16,999
Mar.	7,184	6,231	7,466	6,157	5,731	6,737	17,096	15,573	17,750
Apr.	7,373	6,661	7,634	6,359	5,702	7,164	17,801	16,638	18,184
May	6,737	7,168	7,660	6,140	6,300	7,038	18,389	17,702	18,928
June	6,306	6,953	6,978	6,832	7,136	6,950	17,858	17,159	18,741
July	5,284	6,674		7,070	8,729		16,004	14,974	
Aug.	6,480	8,343		7,983	9,350		14,664	13,981	
Sept.	5,651	7,103		6,758	7,154		13,511	13,543	
Oct.	5,065	6,929		5,024	5,662		13,539	15,285	
Nov.	4,775	5,592		4,723	5,002		13,585	15,743	
Dec.	4,969	5,184		4,712	4,858		13,692	16,117	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1922	2,547,208	2,302,923	244,285	102,053	94,904	7,149	2,649,261
1923	4,020,255	3,631,728	388,527	146,438	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927							
July	268,474	236,866	31,608	10,987	8,719	2,268	279,461
Aug.	308,807	274,378	34,429	12,526	10,139	2,387	321,333
Sept.	260,420	226,440	33,980	11,262	8,681	2,581	271,682
Oct.	219,712	183,041	36,671	7,791	6,236	1,555	227,503
Nov.	134,381	109,742	24,639	6,617	5,173	1,444	140,998
Dec.	133,178	105,784	27,394	3,435	2,277	1,158	136,613
TOTAL	3,593,887	2,938,868	453,019	179,426	146,870	32,556	3,573,313
1928							
Jan.	225,039	199,032	26,007	8,463	6,705	1,758	282,502
Feb.	323,368	290,330	32,358	12,504	10,315	2,189	335,872
March	412,825	371,408	41,417	9,724	7,478	2,246	422,549
April	409,948	364,877	45,071	24,240	20,546	3,694	434,188
May	425,990	375,798	50,192	33,942	29,764	4,178	459,932
June	396,967	356,439	40,528	28,399	25,341	3,058	425,366
July	390,445	237,933	52,512	25,226	20,122	5,104	415,671
Aug.	458,429	400,689	57,740	31,245	24,274	6,971	489,674
Sept.	413,722	358,872	54,850	21,193	16,572	4,621	434,915
Oct.	397,096	339,976	57,120	18,536	13,016	5,520	415,632
Nov.	256,936	217,256	39,680	11,769	8,154	3,615	268,705
Dec.	233,135	205,144	27,991	9,425	6,734	2,691	242,560
TOTAL	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929							
Jan.	402,154	350,617	51,537	21,501	17,164	4,337	423,655
Feb.	466,084	407,589	58,495	31,287	28,486	2,801	497,371
March	584,733	513,266	69,559	40,621	32,833	7,788	625,354
April	620,656	538,679	81,977	41,901	34,392	7,509	662,557
May	603,969	516,055	86,596	31,559	25,129	6,430	635,528
June	545,252	453,956	91,296	21,492	16,511	4,981	566,744

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA[1]							DUTCH EAST INDIES[1]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[3]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[3]	Amazon Valley	All Other[4]	World Total[7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,958
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	8,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,523
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1927:															
July	23,947	12,697	11,250	4,018	827	859	544	333	4,771	6,142	11,566	519	1,757	1,113	43,699
Aug.	30,371	17,105	13,266	5,357	688	1,133	623	546	4,355	6,682	12,440	716	1,928	969	48,703
Sept.	29,835	12,095	17,740	4,911	479	645	566	498	3,685	5,957	9,853	497	2,072	1,215	48,066
Oct.	29,846	15,801	14,045	5,245	802	721	591	542	3,810	7,755	13,633	775	2,752	939	51,520
Nov.	28,277	19,860	8,417	4,464	1,277	1,241	591	600	4,127	6,587	14,395	683	2,369	1,627	46,378
Dec.	32,185	17,865	14,320	4,130	1,395	946	592	664	5,768	7,878	13,438	1,191	3,340	1,444	55,101
1928:															
Jan.	27,789	16,618	11,171	3,830	1,605	842	581	525	4,851	7,988	11,774	1,100	2,273	1,025	47,565
Feb.	28,848	12,911	15,937	4,947	1,081	667	581	536	4,052	6,757	8,630	787	1,612	1,276	46,860
Mar.	27,879	10,508	17,371	3,683	775	645	581	269	3,999	5,825	9,690	700	2,750	1,211	47,499
Apr.	20,139	9,385	10,804	3,233	789	630	494	258	3,993	5,040	5,499	736	1,014	1,323	33,810
May	26,483	10,350	16,133	3,091	654	842	494	241	4,943	5,355	10,347	717	2,602	1,135	45,994
June	22,994	16,168	6,826	3,107	963	926	494	451	5,419	5,863	13,655	725	1,399	960	40,788
July	30,481	13,383	17,098	5,129	1,043	905	593	366	5,602	7,566	11,594	698	1,264	873	52,731
Aug.	35,674	15,114	20,560	5,720	398	1,227	593	544	5,668	7,438	11,893	712	1,732	450	56,936
Sept.	29,769	11,239	18,530	4,675	457	938	594	447	4,956	6,536	9,863	969	1,614	494	50,073
Oct.	24,476	12,603	11,873	3,999	864	949	564	457	5,295	7,474	10,124	513	1,399	732	44,243
Nov.	68,135	10,436	57,699	8,005	1,048	772	564	425	4,950	7,902	7,805	943	1,790	623	92,526
Dec.	66,763	11,122	55,641	7,848	1,113	744	565	294	5,120	8,792	10,896	948	2,220	588	94,769
1929:															
Jan.	52,546	13,415	39,131	8,301	1,664	873	500*	461	5,640	8,067	11,076	395	2,134	642	78,884*
Feb.	47,926	12,103	35,823	6,943	1,117	955	500*	495	6,572	7,511	10,384	965	2,104	520	73,889*
Mar.	49,448	14,553	34,895	6,713	1,413	758	500*	499	5,515	6,620	10,629	741	2,332	786	71,401*
Apr.	49,816	11,414	38,402	4,676	727	747	500*	306	5,997	6,645	11,321	568	1,950	569	72,408*
May	43,960	15,593	28,367	4,850	800	966	500*	453	6,264	6,961	13,437	650	1,922	733	65,903*
June	40,398	14,344	26,054	6,051		1,061	500*	422	5,582	6,693	11,270	608	1,398		
July	46,454	15,071	31,383	5,746		1,247	500*	462				555	1,457		

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,459 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States*	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ee)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	8,995	2,771	3,149	2,418	9	342,378
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,128	62	1,815	8,840	5,510	2,292	2,008	567	370,641
1921	179,678	42,087	15,135	21,920	8,124	21,718	3,906	165	1,614	1,705	1,022	1,279	2,245	569	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	-8,807	1,778	589	567	395,885
1923	309,372	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	-11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	-807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,498
1926	395,667	84,365	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,870	4,046	1,299	1,870	613,649
1927	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	627,789
1928	404,496	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	596,695
1927:															
June	31,270	2,282	2,387	3,632	2,086	798	942	1,506	557	583	-17	243	164	183	46,616
July	35,719	1,116	2,384	2,899	2,104	1,505	1,007	415	900	429	66	227	177	236	49,184
August	31,001	3,463	2,795	3,119	2,013	1,970	1,274	386	650	604	-63	312	138	123	47,786
September	29,801	7,806	1,956	2,891	1,850	2,025	684	518	772	552	-33	451	155	272	49,694
October	27,671	5,888	3,479	4,202	1,790	1,966	1,021	1,075	908	465	156	401	153	363	49,538
November	36,128	1,687	3,661	4,209	1,916	1,575	1,167	1,312	836	749	298	474	246	317	54,570
December	28,082	309	4,696	3,108	2,302	2,710	1,462	1,453	1,242	784	-202	514	268	300	47,028
1928:															
Jan.	37,120	1,921	1,764	2,485	2,290	1,361	760	755	802	589	52	261	335	376	50,871
Feb.	30,926	3,143	2,526	2,984	2,553	1,248	437	783	616	599	98	307	296	297	46,813
Mar.	36,893	3,179	1,902	3,521	2,989	1,694	763	231	918	816	95	351	497	398	54,247
April	35,663	—2,280	2,204	2,719	1,938	2,334	1,114	1,820	832	575	280	339	304	159	48,001
May	28,660	—5,322	3,297	2,944	2,180	2,288	1,090	3,893	655	746	209	485	220	213	41,558
June	25,143	—3,031	3,597	2,968	2,186	2,102	984	4,111	348	743	133	346	251	182	40,063
July	28,170	—1,374	3,518	3,387	2,692	2,026	1,598	724	591	895	395	294	175	384	43,475
Aug.	28,827	48	3,527	2,744	2,447	1,868	875	632	707	519	316	359	58	94	43,021
Sept.	36,800	4,199	3,524	3,553	2,812	1,837	1,278	20	603	597	345	377	277	235	56,457
Oct.	41,667	—934	3,728	4,386	2,943	3,711	1,049	98	766	696	141	527	250	318	59,346
Nov.	33,846	—3,141	3,278	3,694	2,799	2,150	1,340	689	837	544	31	337	252	282	46,938
Dec.	40,781	8,438	3,633	2,470	2,618	3,002	1,145	1,378	755	639	148	435	263	200	65,905
1929:															
Jan.	53,922	11,951	5,645	4,711	3,759	3,776	1,481	956	1,061	749	218	638	179	525	89,571
Feb.	61,331	5,179	5,001	4,613	2,908	2,727	1,259	684	1,131	627	113	226	115	356	86,275
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	316	354	80	409	77,091
Apr.	52,447	8,295	4,854	5,351	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,395
May	48,350	5,112	3,152	3,682	2,937	2,314	1,417		1,437	854	291	468	37	277	
June	38,676	5,361		3,948	3,075		1,624		2,215	672	687				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. *United States imports of guayule are not included in this compilation; such imports amounted to 4,305 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 208 tons in the first 5 months of 1929.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics Yards	Rubber Heels Pairs	Rubber Soles Pairs	Mechanical Goods Shipments Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	23,988,000	206,970,000	16,211,620 (2)	64,877,000
1926	29,328,000	183,312,000	12,253,000	76,789,000
1927	37,872,000	201,014,000	27,160,000	68,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1928:				
January	2,177,000	17,682,000	3,431,000	$5,630,000
February	2,575,000	19,181,000	3,628,000	5,838,000
March	2,853,000	22,583,000	3,747,000	6,675,000
April	2,416,000	18,575,000	2,928,000	5,406,000
May	2,744,000	21,597,000	3,519,000	6,274,000
June	2,953,000	18,763,000	3,321,000	6,126,000
July	3,447,000	17,620,000	3,168,000	5,157,000
August	4,613,000	21,289,000	3,461,000	6,306,000
September	4,966,000	21,451,000	2,725,000	5,393,000
October	5,914,000	21,932,000	2,297,000	5,837,000
November	4,173,000	18,686,000	2,649,000	5,201,000
December	2,348,000	15,811,000	2,771,000	5,271,000
1929:				
January	2,828,000	19,975,000	3,876,000	6,033,000
February	3,095,000	18,979,000	2,869,000	6,135,000
March	4,123,000	17,226,000	2,746,000	7,013,000
April		17,256,000	2,601,000	

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Gutta Percha	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1919	1,430	760,690	727	937,038	8,332	2,213,964	2,900	1,068,698
1920	758	345,985	1,064	1,260,043	5,672	2,068,501	3,183	1,520,309
1921	58	26,945	814	1,077,859	1,745	351,893	985	333,564
1922	127	57,040	812	978,765	2,335	403,812	818	281,012
1923	1,155	542,227	700	898,524	4,565	853,808	912	375,167
1924	1,356	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	1,603	629,284
1926	4,805	2,562,096	354	327,213	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,494	728,172
1928:	3,075	1,755,685	731	430,855	7,552	2,540,059	1,597	777,128
Jan.	432	242,339	27	24,218	588	183,705	150	86,702
Feb.	489	281,295	33	32,165	403	142,621	312	215,085
Mar.	575	365,927	32	26,460	829	388,616	115	57,833
Apr.	512	312,131	47	32,924	592	174,970	68	27,627
May	452	233,414	—	—	679	226,064	100	42,762
June	424	220,081	9	6,799	293	91,152	28	12,374
July	191	100,842	123	46,747	378	113,295	81	27,344
Aug.	—	—	399	165,460	451	126,962	147	60,738
Sept.	—	—	60	38,198	2,028	713,786	125	56,768
Oct.	—	—	121	59,358	429	129,065	239	94,570
Nov.	—	—	59	41,119	472	140,116	88	35,409
Dec.	—	—	88	58,311	522	156,154	145	59,911
1929:								
Jan.	—	—	46	30,374	484	152,260	138	62,950
Feb.	—	—	82	70,209	823	255,594	40	19,806
Mar.	—	—	90	75,444	428	122,026	1	1,140
Apr.	83	38,241	163	93,240	1,086	315,621	1	1,086
May	125	57,260	70	67,891	752	212,400	76	24,053
June	145	62,808	31	26,038	802	248,143	77	25,612

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1919	81,866	73,535	36.3	.....	1924	80,079	76,072	22.4	.....
1920	86,395	75,297	38.4	.....	1925	132,930	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,834	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1927:									
Jan.	16,526	12,374	39.3	25,908	July	15,488	13,842	47.4	26,599
Feb.	15,860	14,424	47.8	27,291	Aug.	15,109	15,836	47.3	25,157
Mar.	16,788	13,528	37.4	27,124	Sept.	14,392	14,790	54.3	23,429
Apr.	14,483	16,677	46.5	25,712	Oct.	16,127	17,292	64.5	22,176
May	16,159	15,754	46.1	26,419	Nov.	15,477	14,876	55.5	21,728
June	16,652	15,547	46.0	25,811	Dec.	16,083	13,431	52.7	24,980
1928:									
Jan.	14,862	20,140	58.5	21,941	July	17,278	19,070	51.0	17,305
Feb.	15,291	18,670	55.4	20,848	Aug.	19,049	17,890	41.7	15,881
Mar.	17,069	20,680	57.9	19,558	Sept.	18,693	17,795	44.6	17,991
Apr.	15,393	19,280	58.8	19,283	Oct.	17,182	18,420	45.1	17,026
May	18,945	20,215	54.1	18,137	Nov.	18,245	18,380	49.1	22,399
June	18,781	18,140	48.2	18,709	Dec.	17,728	14,320	45.9	24,785
1929:									
Jan.	18,685	21,068	49.1	24,394	July	18,387	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.				
Mar.	19,984	20,867	46.7	22,076	Sept.				
Apr.	19,899	22,435	47.3	20,680	Oct.				
May	20,385	23,176	47.1	19,479	Nov.				
June	18,416	18,141	42.0	17,980	Dec.				

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927 and 9,577 tons in 1928.

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